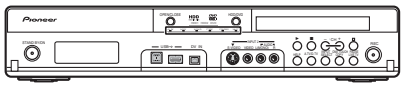
Pioneer sound.vision.soul

Service Manual



DVR-545HX-S

ORDER NO.
RRV3504

DVD RECORDER

DVR-545HX-S

THIS MANUAL IS APPLICABLE TO THE FOLLOWING MODEL(S) AND TYPE(S).

Model	Type	Power Requirement	Region No.	Serial No. Please confirm 3rd & 4th alphabetical letters.
DVR-545HX-S	WYXK5	AC 220 V to 240 V	2	&&UK######$$
DVR-545HX-S	WVXK5	AC 220 V to 240 V	2	&&UK######$$

- **When servicing this model, some service procedures may reset the customer settings to the factory default settings. Make sure to explain this to the customer.**

An HDD (Hard Disc Drive) is mounted in this product.
The HDD is a precision instrument very vulnerable to shock and electrostatic charges. Please read "7.3 Cautions on Handling the HDD" in this manual and exercise sufficient caution when handling the HDD itself, as well as the product with the HDD built in.
When an HDD becomes defective and inoperable, restoration of the user's data recorded on the HDD, or copying of the user's recorded data to other media (such as a new HDD) is totally impossible. Before servicing, OBTAIN THE USER'S PRIOR CONSENT to that effect.
The user must be made aware that all recorded data are deleted if the HDD is intialized.

For details, refer to "Important Check Points for Good Servicing" .

PIONEER CORPORATION 4-1, Meguro 1-chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS (USA) INC. P.O. Box 1760, Long Beach, CA 90801-1760, U.S.A.
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ⓒ**PIONEER CORPORATION 2006**

T-ZZV OCT. 2006 printed in Japan

SAFETY INFORMATION

■ LABEL CHECK

IMPORTANT

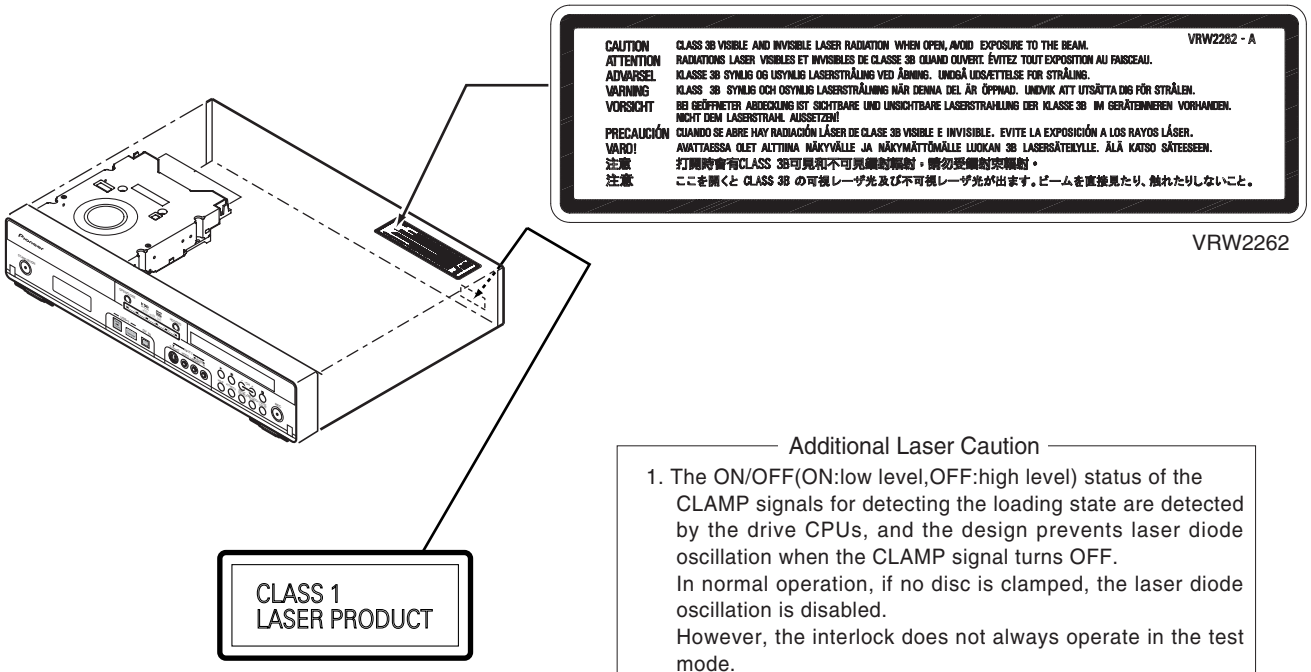
THIS PIONEER APPARATUS CONTAINS LASER OF CLASS 1.
SERVICING OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUCTED PERSON.

LASER DIODE CHARACTERISTICS

MAXIMUM OUTPUT POWER: 100 mW
WAVELENGTH: 654 - 662 nm

LASER DIODE CHARACTERISTICS

MAXIMUM OUTPUT POWER: 5 mW
WAVELENGTH: 770 - 810 nm


VRW2262 - A
CAUTION CLASS 3B VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN, AVOID EXPOSURE TO THE BEAM.
ATTENTION RADIATIONS LASER VISIBLES ET INVISIBLES DE CLASSE 3B QUAND OUVERT. ÉVITEZ TOUT EXPOSITION AU FAISCEAU.
ADVARSEL KLASSE 3B SYNLIG OG USYNLIG LASERSTRÅLING VED ÅBNING. UNDGÅ UDSÆTTELSE FOR STRÅLING.
VARNING KLASS 3B SYNLIG OCH OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD. UNDVIK ATT UTSÄTTA DIG FÖR STRÅLEN.
VORSICHT BEI GEÖFFNETER ABDECKUNG IST SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG DER KLASSE 3B IM GERÄTEINNEREN VORHANDEN. NICHT DEM LASERSTRAHL AUSSETZEN!
PRECAUCIÓN CUANDO SE ABRE HAY RADIACIÓN LÁSER DE CLASE 3B VISIBLE E INVISIBLE. EVITE LA EXPOSICIÓN A LOS RAYOS LÁSER.
VARO! AVATTAESSA OLET ALTTIINA NÄKYVÄLLE JA NÄKYMÄTTÖMÄLLE LUOKAN 3B LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.
注意 打開時會有CLASS 3B可見和不可見鐳射輻射。開啟受鐳射束輻射。
注意 ここを開くと CLASS 3B の可視レーザ光及び不可視レーザ光が出ます。ビームを直接見たり、触れたりしないこと。

VRW2262

Additional Laser Caution

1. The ON/OFF(ON:low level,OFF:high level) status of the CLAMP signals for detecting the loading state are detected by the drive CPUs, and the design prevents laser diode oscillation when the CLAMP signal turns OFF.
   In normal operation, if no disc is clamped, the laser diode oscillation is disabled.
   However, the interlock does not always operate in the test mode.

2. When the cover is opened, close viewing of the objective lens with the naked eye will cause exposure to a Class 3A laser beam.

[Important Check Points for Good Servicing]

In this manual, procedures that must be performed during repairs are marked with the below symbol.
Please be sure to confirm and follow these procedures.

1. Product safety

Please conform to product regulations (such as safety and radiation regulations), and maintain a safe servicing environment by following the safety instructions described in this manual.

① Use specified parts for repair.

Use genuine parts. Be sure to use important parts for safety.

② Do not perform modifications without proper instructions.

Please follow the specified safety methods when modification(addition/change of parts) is required due to interferences such as radio/TV interference and foreign noise.

③ Make sure the soldering of repaired locations is properly performed.

When you solder while repairing, please be sure that there are no cold solder and other debris.
Soldering should be finished with the proper quantity. (Refer to the example)

④ Make sure the screws are tightly fastened.

Please be sure that all screws are fastened, and that there are no loose screws.

⑤ Make sure each connectors are correctly inserted.

Please be sure that all connectors are inserted, and that there are no imperfect insertion.

⑥ Make sure the wiring cables are set to their original state.

Please replace the wiring and cables to the original state after repairs.
In addition, be sure that there are no pinched wires, etc.

⑦ Make sure screws and soldering scraps do not remain inside the product.

Please check that neither solder debris nor screws remain inside the product.

⑧ There should be no semi-broken wires, scratches, melting, etc. on the coating of the power cord.

Damaged power cords may lead to fire accidents, so please be sure that there are no damages.
If you find a damaged power cord, please exchange it with a suitable one.

⑨ There should be no spark traces or similar marks on the power plug.

When spark traces or similar marks are found on the power supply plug, please check the connection and advise on secure connections and suitable usage. Please exchange the power cord if necessary.

⑩ Safe environment should be secured during servicing.

When you perform repairs, please pay attention to static electricity, furniture, household articles, etc. in order to prevent injuries.
Please pay attention to your surroundings and repair safely.

2. Adjustments

To keep the original performance of the products, optimum adjustments and confirmation of characteristics within specification.
Adjustments should be performed in accordance with the procedures/instructions described in this manual.

3. Lubricants, Glues, and Replacement parts

Use grease and adhesives that are equal to the specified substance.
Make sure the proper amount is applied.

4. Cleaning

For parts that require cleaning, such as optical pickups, tape deck heads, lenses and mirrors used in projection monitors, proper cleaning should be performed to restore their performances.

5. Shipping mode and Shipping screws

To protect products from damages or failures during transit, the shipping mode should be set or the shipping screws should be installed before shipment. Please be sure to follow this method especially if it is specified in this manual.

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1. SPECIFICATIONS

● Specifications

General

Power requirements . . . . . 220 V to 240 V, 50 Hz / 60 Hz
Power consumption . . . . . 52 W
Power consumption in standby mode . . . . . 0.98 W
(Front panel display : off)
Weight . . . . . 4.8 kg
Dimensions . . . . . 420 mm (W) x 79 mm (H) x 319 mm (D)
Operating temperature . . . . . +5 °C to +35 °C
Operating humidity . . . . . 5 % to 85 %
(no condensation)
TV system . . . . . PAL/SECAM/NTSC (external input only)

Readable discs

DVD-Video, DVD-RW, DVD-R, DVD+R, DVD+RW, DVD-RAM, Video CD, Super VCD, CD, CD-R/-RW (WMA, MP3, JPEG, CD-DA, DivX)

Recording discs and formats

DVD-R/-RW : VR mode and Video mode
DVD+R/+RW : +VR mode
DVD-RAM : VR mode
DVD-R DL : VR mode and Video mode
DVD+R DL : +VR mode

Video recording format

Sampling frequency . . . . . 13.5 MHz
Compression format . . . . . MPEG

Audio recording format

Sampling frequency . . . . . 48 kHz
Compression format . . . . . Dolby Digital or Linear PCM
(uncompressed)

Recording time

HDD (160 GB)

Fine (XP) . . . . . Approx. 34 h
Standard Play (SP) . . . . . Approx. 68 h
Long Play (LP) . . . . . Approx. 136 h
Extended Play (EP) . . . . . Approx. 204 h
Super Long Play (SLP) . . . . . Approx. 272 h
Super Extended Play (SEP) . . . . . Approx. 340 h
Manual Mode (MN) . . . . . Approx. 34 h to 455 h

DVD-R/-RW, DVD+R/+RW, DVD-RAM

Fine (XP) . . . . . Approx. 1 h
Standard Play (SP) . . . . . Approx. 2 h
Long Play (LP) . . . . . Approx. 4 h
Extended Play (EP) . . . . . Approx. 6 h
Super Long Play (SLP) . . . . . Approx. 8 h
Super Extended Play (SEP) . . . . . Approx. 10 h
(DVD-R/-RW, DVD-RAM only)

Manual Mode (MN)
DVD-R/-RW/-RAM . . . . . Approx. 1 h to 13 h
DVD+R/+RW . . . . . Approx. 1 h to 8 h

DVD-R DL/DVD+R DL

Fine (XP) . . . . . Approx. 1 h 51 m
Standard Play (SP) . . . . . Approx. 3 h 35 m
Long Play (LP) . . . . . Approx. 7 h 11 m
Extended Play (EP) . . . . . Approx. 10 h 46 m
Super Long Play (SLP) Approx. 14 h 21 m
Super Extended Play (SEP) . . . . . Approx. 17 h 57 m
(DVD-R DL only)

Manual Mode (MN)
DVD-R DL . . . . . Approx. 1 h 51 m to 24 h
DVD+R DL . . . . . Approx. 1 h 51 m to 14 h 21 m

Timer

Programs . . . . . 1 month/32 programs
Clock . . . . . Quartz lock (24-hour digital display)

Tuner (analog)

Receivable channels

	SECAM B/G PAL B/G		PAL I	
	Frequency	Channel	Frequency	Channel
VHF (low)	47 MHz to 89 MHz	E2 to E4 X to Z	44 MHz to 89 MHz	A to C X to Z
VHF (high)	104 MHz to 300 MHz	E5 to E12 S1 to S20 M1 to M10 U1 to U10	104 MHz to 300 MHz	D to J 11, 13 S1 to S20
Hyper	302 MHz to 470 MHz	S21 to S41	302 MHz to 470 MHz	S21 to S41
UHF	470 MHz to 862 MHz	E21 to E69	470 MHz to 862 MHz	E21 to E69

	SECAM L		SECAM D/K PAL D/K	
	Frequency	Channel	Frequency	Channel
VHF (low)	49 MHz to 65 MHz	FB,FC1,FC	49 MHz to 94 MHz	R1 to R5
VHF (high)	104 MHz to 300 MHz	F1 to F6 B to Q	104 MHz to 300 MHz	R6 to R12 S1 to S20
Hyper	300 MHz to 470 MHz	S21 to S41	302 MHz to 470 MHz	S21 to S41
UHF	470 MHz to 862 MHz	21 to 69	470 MHz to 862 MHz	E21 to E69

STEREO
B/G - A2
I - NICAM
L - NICAM
B/G - NICAM
D/K - NICAM

Tuner (digital)

Receiving system . . . . . DVB-T (2 K / 8 K COFDM)
Tuner VHF/UHF . . . . . VHF band III (170 MHz to 230 MHz)
UHF band IV, V (470 MHz to 862 MHz)
Auto Channel Preset . . . . . 999 ch, Auto Preset
Auto Label, Auto Sort
Audio . . . . . Stereo MPEG layer I/II

This product's digital tuner has been confirmed for use in the following countries: Belgium, France, Germany, Italy, Spain, UK.

Input/Output

Antenna
..... 75Ω IEC 169-2 connector for VHF/UHF in/out (analog)
..... 75Ω IEC 169-2 connector for VHF/UHF in/out (digital)

Video input ..... AV2 (Input1), Input 2 (front)
Input3 (rear)
Input level ..... 1 Vp-p (75Ω)
Jacks ... AV connector (Input 1), RCA jack (Input 2, Input 3)

Video output ..... AV1, Output
Output level ..... 1 Vp-p (75Ω)
Jacks ..... AV connector (AV1)
RCA jack (Output)
S-Video input ..... AV2 (Input1), Input 2 (front)
Input3 (rear)
Y (luminance) - Input level ..... 1 Vp-p (75Ω)
C (colour) - Input leve ..... 300 mVp-p (75Ω)
Jacks ..... AV connector (Input 1),
4 pin mini DIN (Input 2, Input 3)

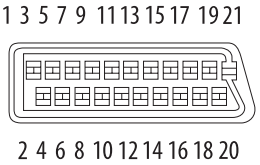
S-Video output ..... AV1, Output
Y (luminance) - Output level ..... 1 Vp-p (75Ω)
C (colour) - Output level ..... 300 mVp-p (75Ω)
Jacks ..... AV connector (AV1), 4 pin mini DIN (Output)

Component video output
Output level ..... Y : 1.0 Vp-p (75Ω)
PB, PR : 0.7 Vp-p (75Ω)
Jacks ..... RCA jacks
RGB input AV2 (Input1)
Input level ..... 0.7 Vp-p (75Ω)
Jacks ..... AV connector (Input 1)
RGB output AV1
Output level ..... 0.7 Vp-p (75Ω)
Jacks ..... AV connector (AV1)
Audio input ..... AV2 (input1), Input 2 (front) L/R
Input 3 (rear) L/R
During audio input ..... 2 V rms
(Input impedance: more than 22 kΩ)
Jacks ..... AV connector (Input 1), RCA jacks (Input 2)

Audio output ..... AV1, Output
During audio output ..... 2 V rms
(Output impedance: less than 1.5 kΩ)
Jacks ..... AV connector (AV1), RCA jacks (Output)

Control input ..... Mini jack
Digital audio ouptut ..... Coaxial
G-LINK™ ..... Mini jack
Common Interface ..... CA module
DV input ..... 4 pin (front)
(i.Link/IEEE 1394 standard)
USB ..... Type A (front), Type B (front)
HDMI ..... 19 pin

AV Connectors (21-pin connector assignment)
AV connector input/output ..... 21-pin connector
This connector provides the video and audio signals for connection to a compatible colour TV or monitor.



PIN no.	AV1(RGB)-TV / AV2(INPUT 1)
1	Audio 2/R out / Audio 2/R out
2	– / Audio 2/R in
11	G out / G in
3	Audio 1/L out / Audio 1/L out
6	– / Audio 1/L in
15	R or C out / R or C in
4	GND
17	GND
7	B out / B in
19	Video out or Y out / Video out
20	– / Video in or Y in
8	Status
21	GND

Supplied accessories

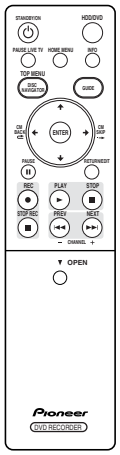
Remote control 1
Dry cell batteries (AA/R6P) 2
Audio / Video cable (red/white/yellow) 1
G-LINK™ cable 1
RF antenna cable ..... 2 (1.5 m and 30 cm)
Power cable 1
Operating Instructions
Warranty card 1

Note : The specifications and design of this product are subject to change without notice, due to improvement.

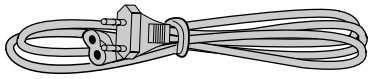
This product includes FontAvenue® fonts licenced by NEC corporation. FontAvenue is a registered trademark of NEC Corporation.

● Accessories

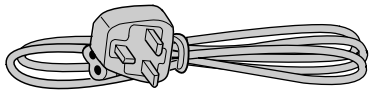
• Remote control ×1
(VXX3092)



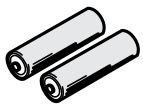
• Power cable ×1
(ADG1127 : WYXK5 types)



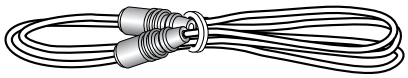
(ADG7077 : WVXK5 type)



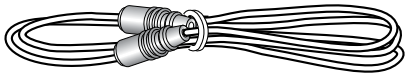
• Dry cell batteries ×2
(AA/R6P)



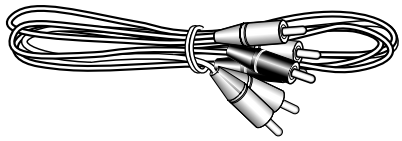
• RF antenna cable(PAL) ×1
(VDE1075) 1.5m



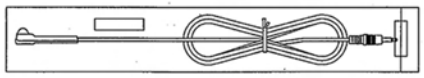
• RF antenna cable(PAL) ×1
(VDE1096) 30cm



• Audio / Video cable(1.5m) ×1
(red/white/yellow)
(VDE1077)



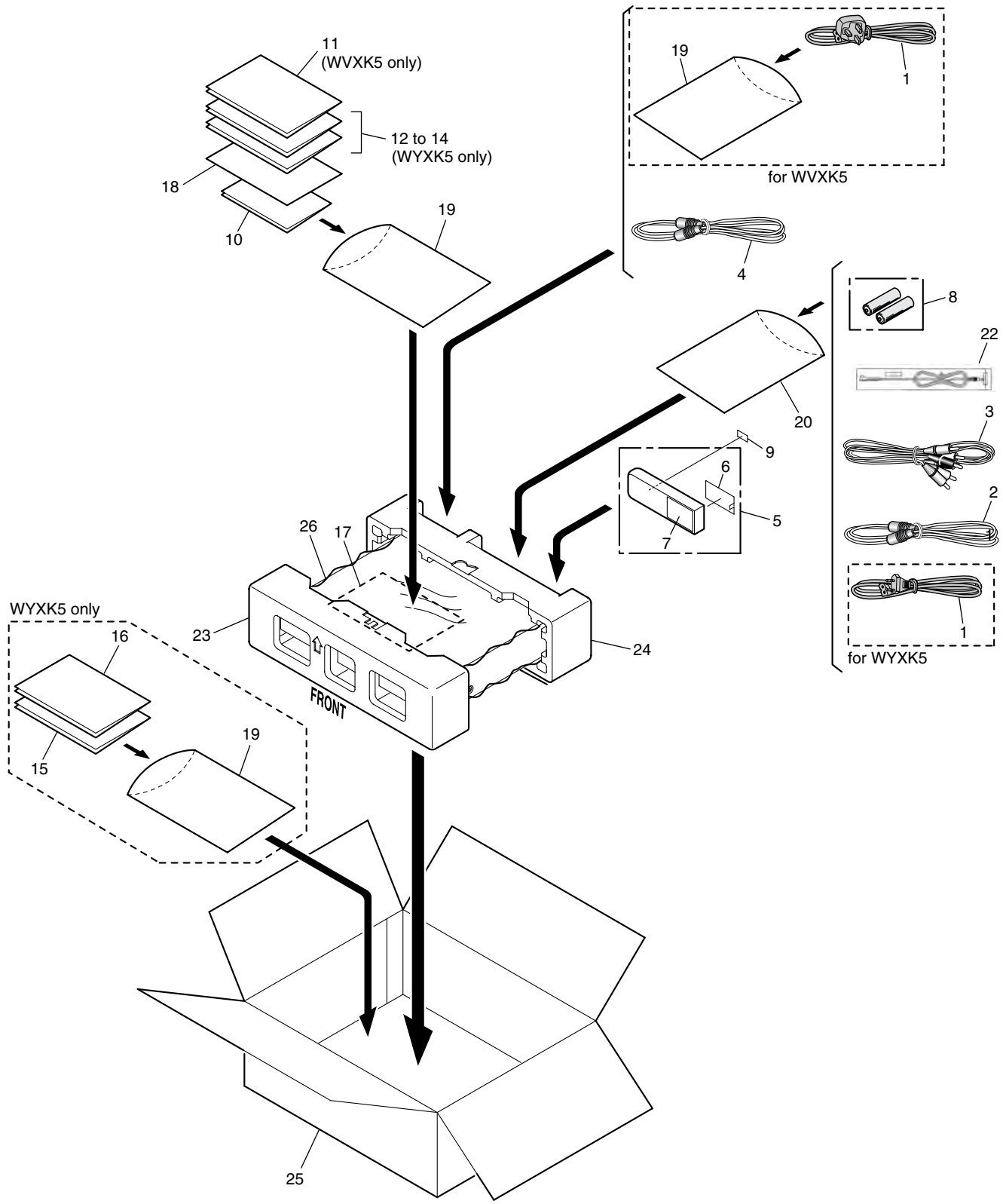
• G-Link Cable (3m) ×1
(VDX1010)



2. EXPLODED VIEWS AND PARTS LIST

NOTES:
- *Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Screws adjacent to ▼ mark on product are used for disassembly.*
- *For the applying amount of lubricants or glue, follow the instructions in this manual. (In the case of no amount instructions, apply as you think it appropriate.)*

2.1 PACKING



(1) PACKING SECTION PARTS LIST

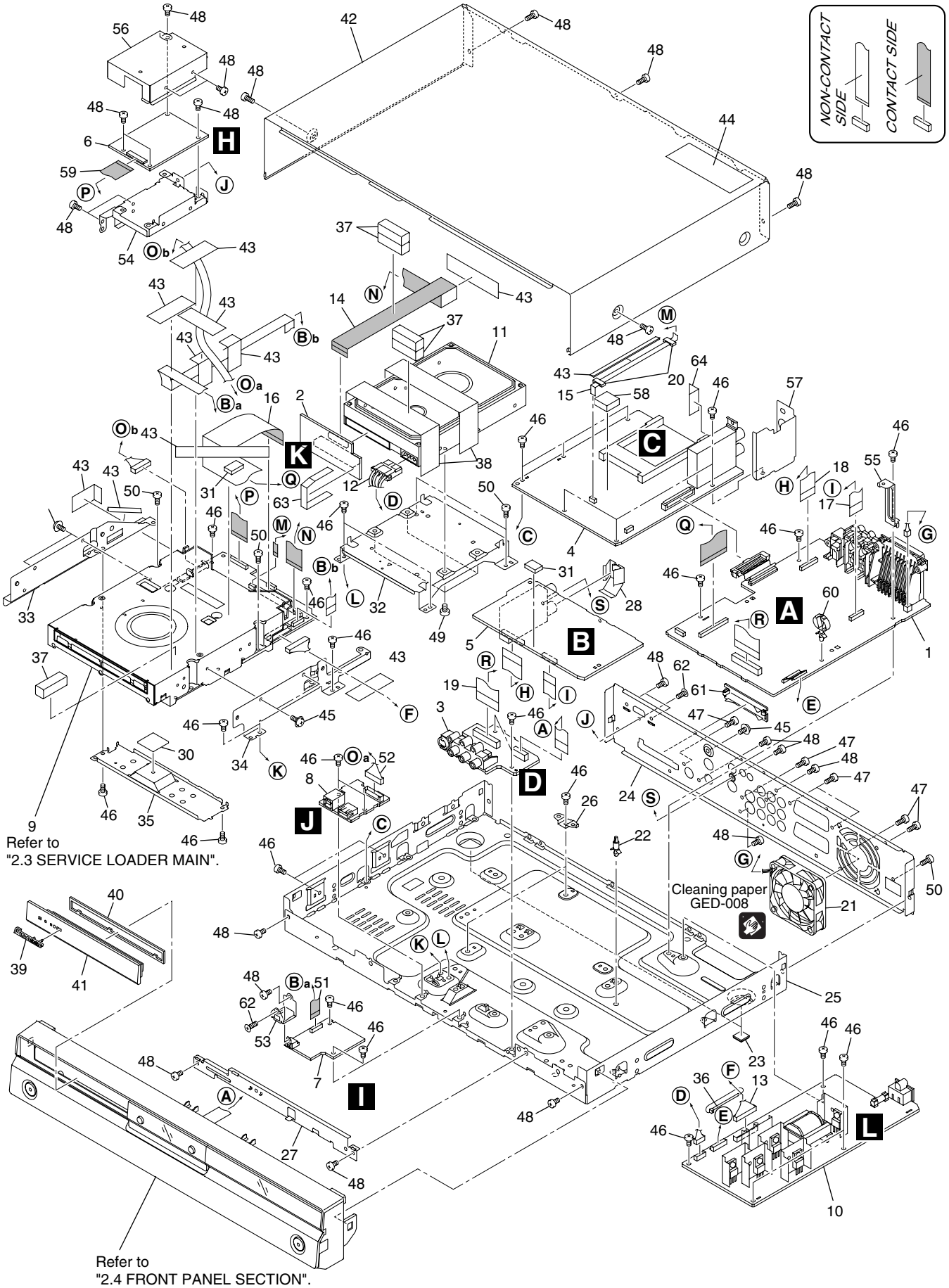
Mark	No.	Description	Part No.
⚠	1	Power Cord	See Contrast table (2)
	2	RF Antenna Cable (PAL)	VDE1075
	3	Audio/Video Cable (1.5m)	VDE1077
	4	RF Antenna Cable (PAL)	VDE1096
	5	Remote Control Unit	VXX3092
	6	Battery Cover	VZN1004
	7	Top Cover	VZN1009
NSP	8	Dry Cell Battery (R6P, AA)	VEM1010
	9	WEEE Label	VRW2231
NSP	10	Warranty Card	ARY7065
	11	Operating Instructions (English)	See Contrast table (2)
	12	Operating Instructions (French)	See Contrast table (2)
	13	Operating Instructions (German)	See Contrast table (2)
	14	Operating Instructions (Italian)	See Contrast table (2)
	15	Operating Instructions (Dutch)	See Contrast table (2)
	16	Operating Instructions (Spanish)	See Contrast table (2)
NSP	17	HDD Caution 8L B	VRR1046
	18	HDD Caution 8L	VRR1072
	19	Polyethylene Bag B5	VHL1051
	20	Polyethylene Bag	VHL1088
	21	•••••••	
	22	G-Link Cable	VDX1010
	23	Front Pad	VHA1408
	24	Rear Pad	VHA1409
	25	Packing Case	See Contrast table (2)
	26	Mirror Sheet	VHL1107

(2) CONTRAST TABLE

DVR-545HX-S/WYXK5 and WVXK5 types are constructed the same except for the following:

Mark	No.	Symbol and Description	DVR-545HX-S /WYXK5	DVR-545HX-S /WVXK5
⚠	1	Power Cord	ADG1127	ADG7077
	11	Operating Instructions (English)	Not used	VRB1456
	12	Operating Instructions (French)	VRC1373	Not used
	13	Operating Instructions (German)	VRC1374	Not used
	14	Operating Instructions (Italian)	VRC1375	Not used
	15	Operating Instructions (Dutch)	VRC1376	Not used
	16	Operating Instructions (Spanis)	VRC1377	Not used
	25	Packing Case	VHG2776	VHG2774

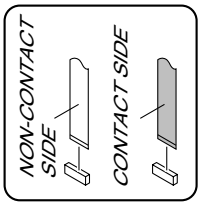
2.2 EXTERIOR SECTION

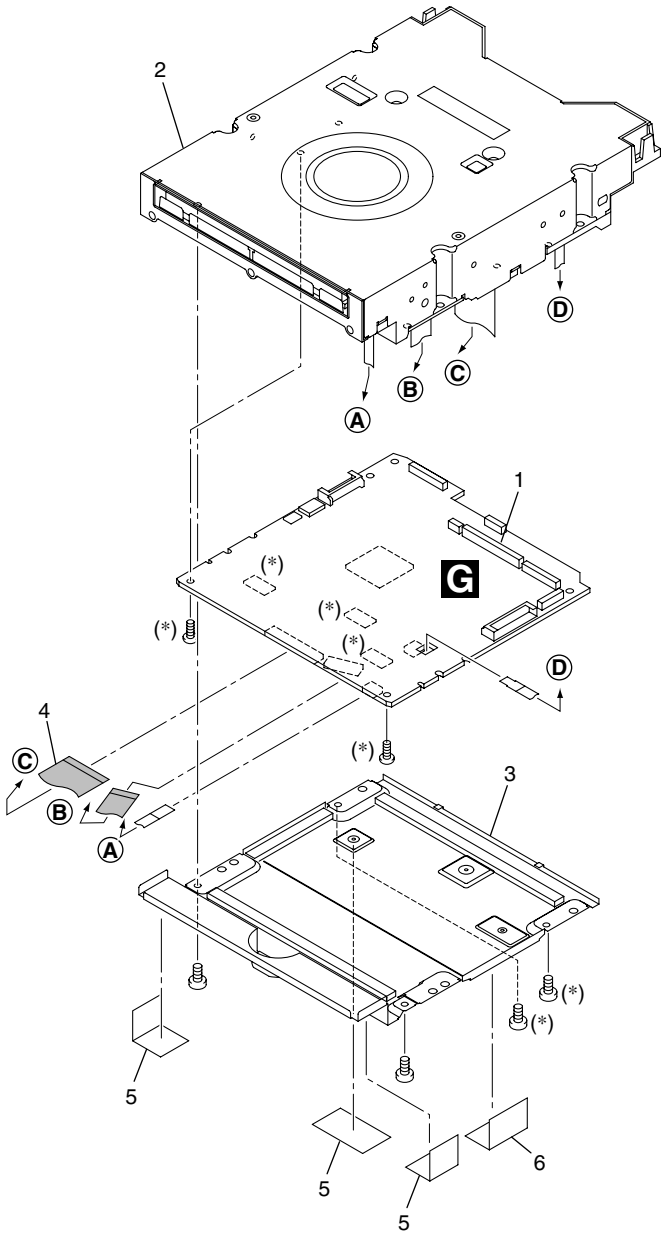


(1) EXTERIOR SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	JACB Assy (for Service)	VXX3172
	2	ATAB Assy	VWV2276
	3	FRJB Assy (for Service)	VXX3179
	4	DTBR Assy (for Service)	VXX3174
	5	TUNB Assy	VWV2262
	6	HDMIB Assy	VWV2247
	7	DVJB Assy	VWV2160
	8	USBB Assy	VWV2161
NSP	9	Service LOADER MAIN	VXU1006
⚠	10	POWER SUPPLY Unit	VWR1404
	11	HDD 160G ST3160212 S	VXF1110
	12	Housing Assy (4P)	VKP2357
	13	Connector Assy (13P)	PF13PP-S22
	14	Flexible Cable (40P)	VDA2136
	15	Flexible Cable (14P)	VDA2158
	16	Flexible Cable (35P)	VDA2138
	17	Flexible Cable (15P)	VDA2148
	18	Flexible Cable (25P)	VDA2147
	19	Flexible Cable (30P)	VDA2153
	20	Ferrite Core	VTH1058
	21	DC Fan Motor 60	VXM1125
	22	PCB Support	AEC1215
	23	Rubber Foot	VEB1349
	24	Rear Panel	VNA2957
NSP	25	Chassis	VNB1055
NSP	26	PCB Stay	VNE2399
NSP	27	Bridge	VNE2429
	28	Earth Plate TU	VBK1162
	29	Earth Spring	VBK1161
	30	Radiation Sheet (Silicone)	VEB1360
	31	Rubber Spacer	VEB1378
NSP	32	HDD Stay	VNE2423
	33	Writer Stay L	VNE2433
	34	Writer Stay R	VNE2434
	35	Heatsink	VNH1077
NSP	36	Binder (BK-1)	ZCA-BK1
	37	Gasket 30 x 10T	VEC2522
	38	Aluminum Tape 180 x 25	VEF1065
	39	Pioneer Name Plate	VAM1148
	40	Tray Sheet	VEC2500
	41	Tray Panel	VNK5910
	42	Bonnet Case S	VXX3206
NSP	43	Tape	ZTA-156A-19
	44	Laser Caution Label	VRW2262
	45	Screw	AMZ30P040FTC
	46	Screw	BBZ30P060FTC
	47	Screw	BPZ30P080FTC
	48	Screw	BSZ30P040FTC
	49	#6-32 Screw	DBA1125
	50	Screw	PBZ30P080FTC
	51	Flexible Cable (24P)	VDA2111
	52	Housing USB (MAIN)	VKP2380
	53	DV Angle	VNE2426
NSP	54	HDMI Stay	VNE2441
NSP	55	TUNB Stay	VNE2443
	56	HDMI Shield	VNF1137
	57	TUNER Shield	VNF1139
	58	Rubber Spacer	VEB1389
	59	Flexible Cable (40P)	VDA2157
	60	Spacing Clip	VEC2133
	61	Rear Cover	VNK6022
	62	Screw	VBA1088
	38	Aluminum Tape 8 x 100	VEF1066
	38	Aluminum Tape 25 x 25	VEF1060

2.3 SERVICE LOADER MAIN





Reuse (*) marked parts when exachanging Service LOADER Assy.

- Silicon Sheet R9B (DEB1726) x3
- Case Screw S (DBA1250) x2
- Frontboard Screw R7C (DBA1220) x2

SERVICE LOADER MAIN PARTS LIST

Mark	No.	Description	Part No.
	1	MAIN Assy (for service)	VXX3176
	2	LOADER Assy (for service)	VXX3156
	3	Low Case U11	DNC1761
	4	FFC U11	DDX1208
NSP	5	Tape	ZTA-156A-19
	6	Aluminum Tape 25x25	VEF1060

A

B

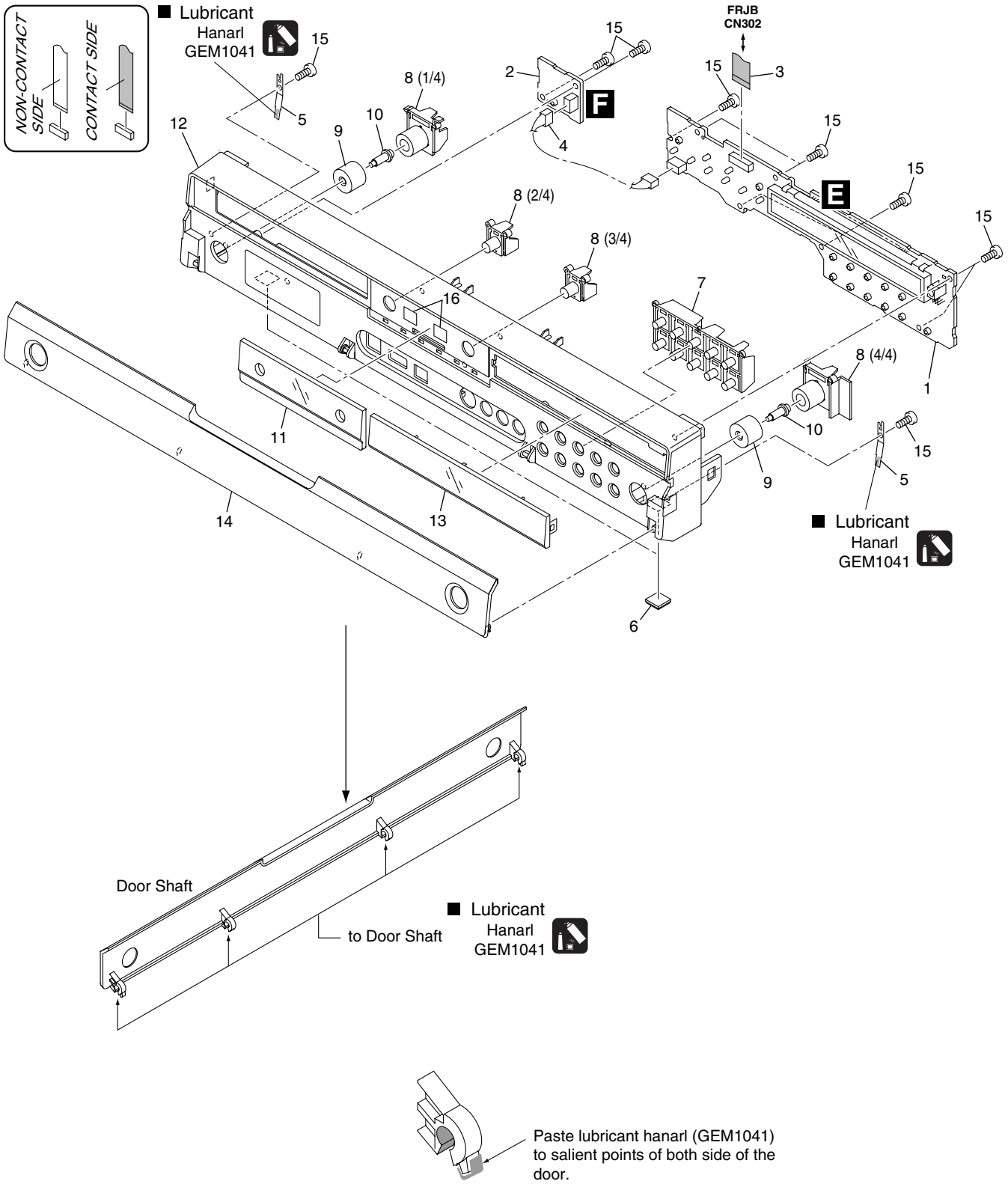
C

D

E

F

2.4 FRONT PANEL SECTION



(1) FRONT PANEL SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	FLKY Assy (for Service)	VXX3177
	2	PWSB Assy (for Service)	VXX3178
	3	Flexible Cable (18P)	VDA2154
	4	Housing Assy (4P)	VKP2386
	5	Door Spring	VBK1159
	6	Rubber Foot	VEB1349
	7	Main Key	VNK5937
	8	Key Base	VNK5938
	9	Key Top	VNK5791
	10	Key Lens	VNK6103
	11	Center Lens	VNK6117
	12	Front Panel	VNK6115
	13	FL Lens PTD	VXA2815
	14	Door PTD	See Contrast table (2)
	15	Screw	BPZ30P080FTC
	16	Hologram Label	VRW2170

(2) CONTRAST TABLE

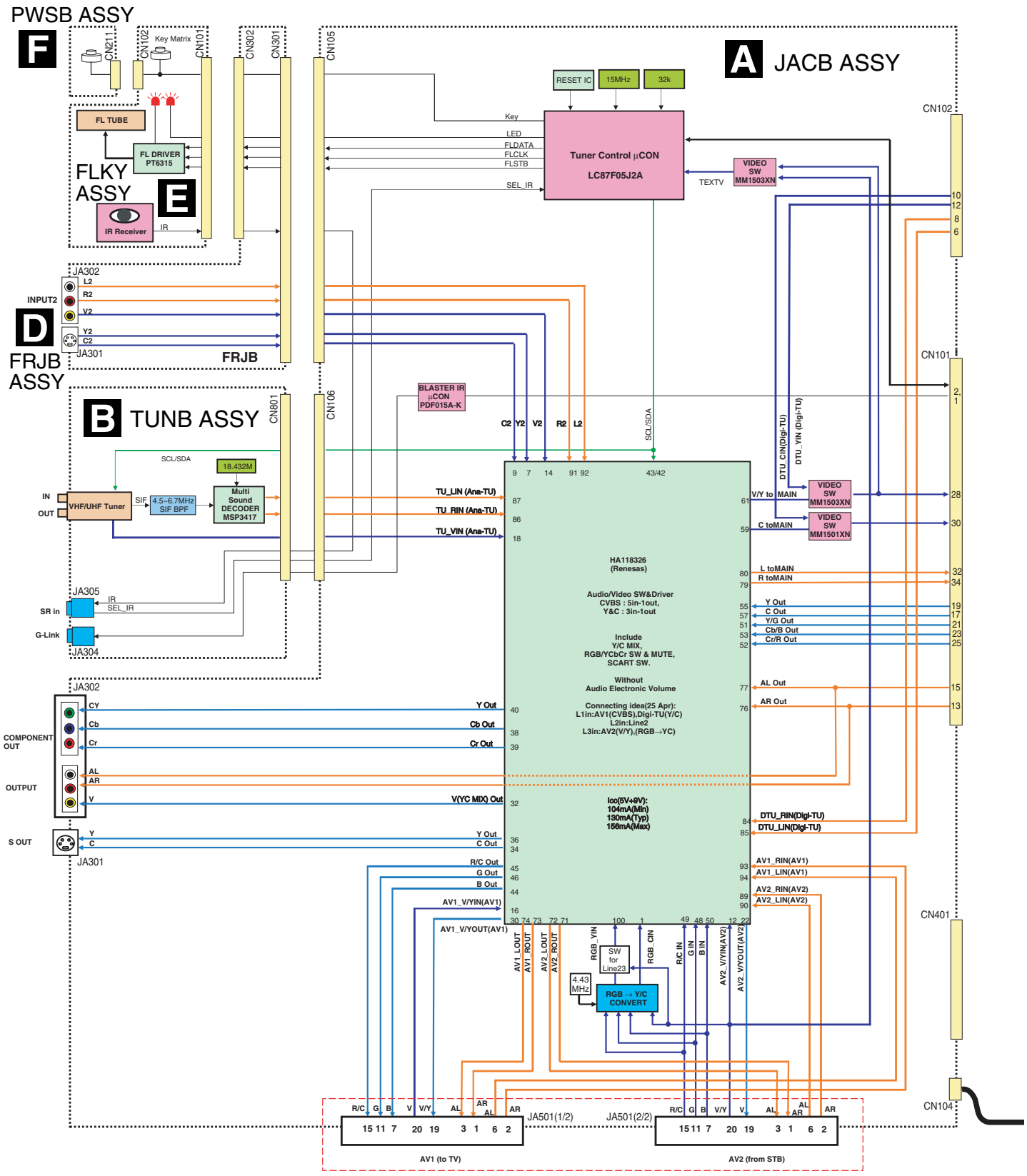
DVR-545HX-S/WYXK5 and WVXK5 types are constructed the same except for the following:

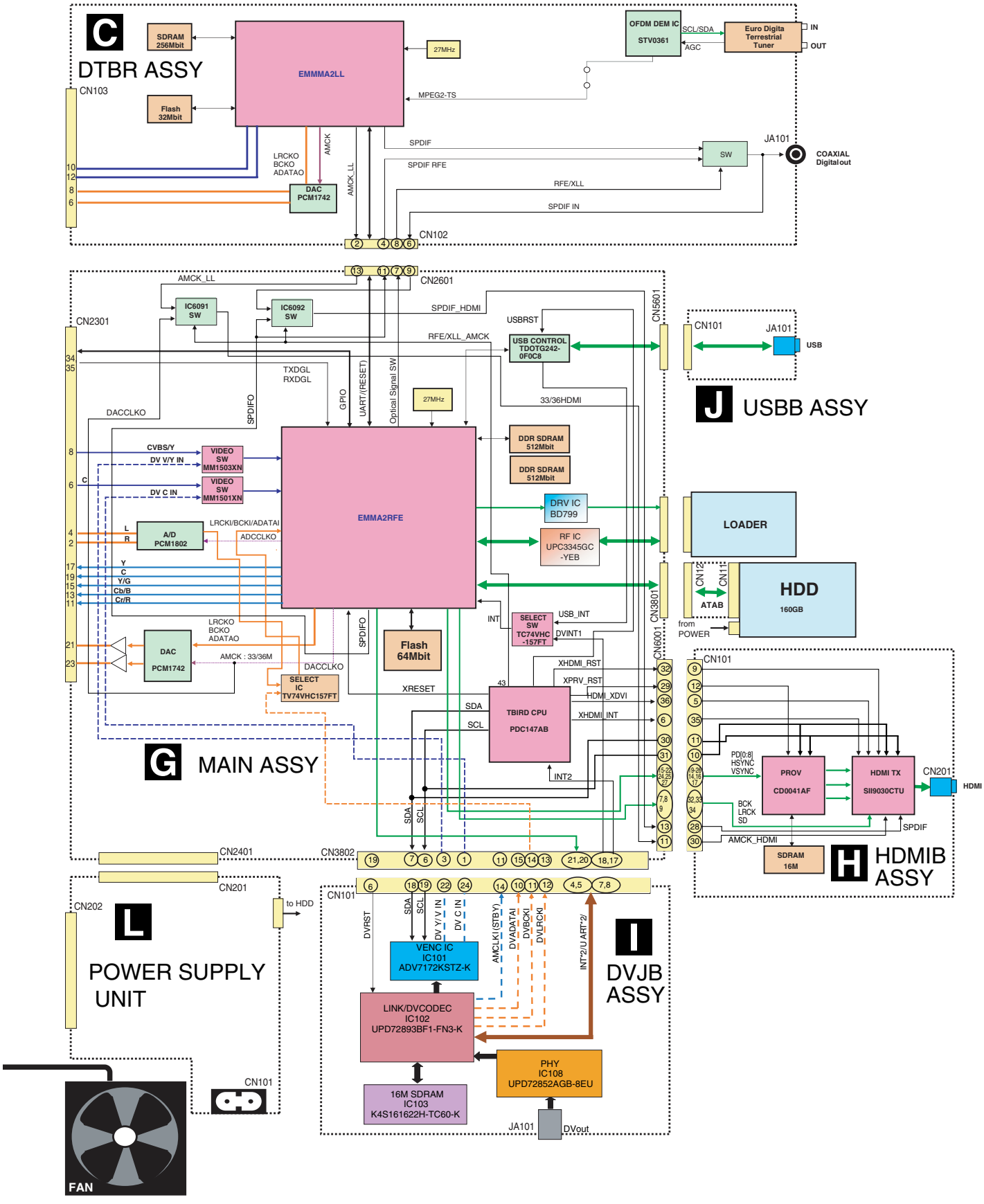
Mark	No.	Symbol and Description	DVR-545HX-S /WYXK5	DVR-545HX-S /WVXK5
	14	Door PTD	VXA2816	VXA2833

3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

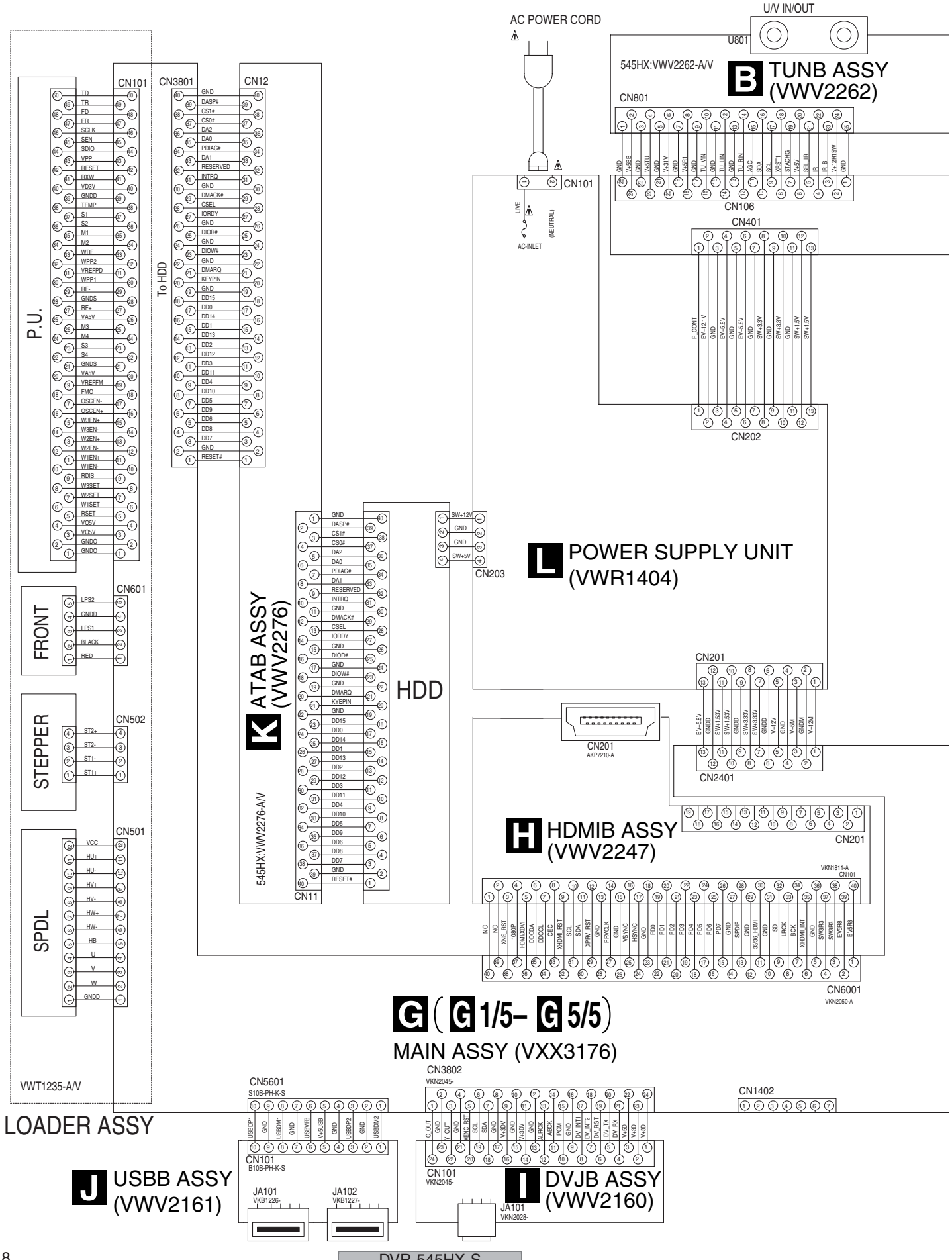
3.1 BLOCK DIAGRAM

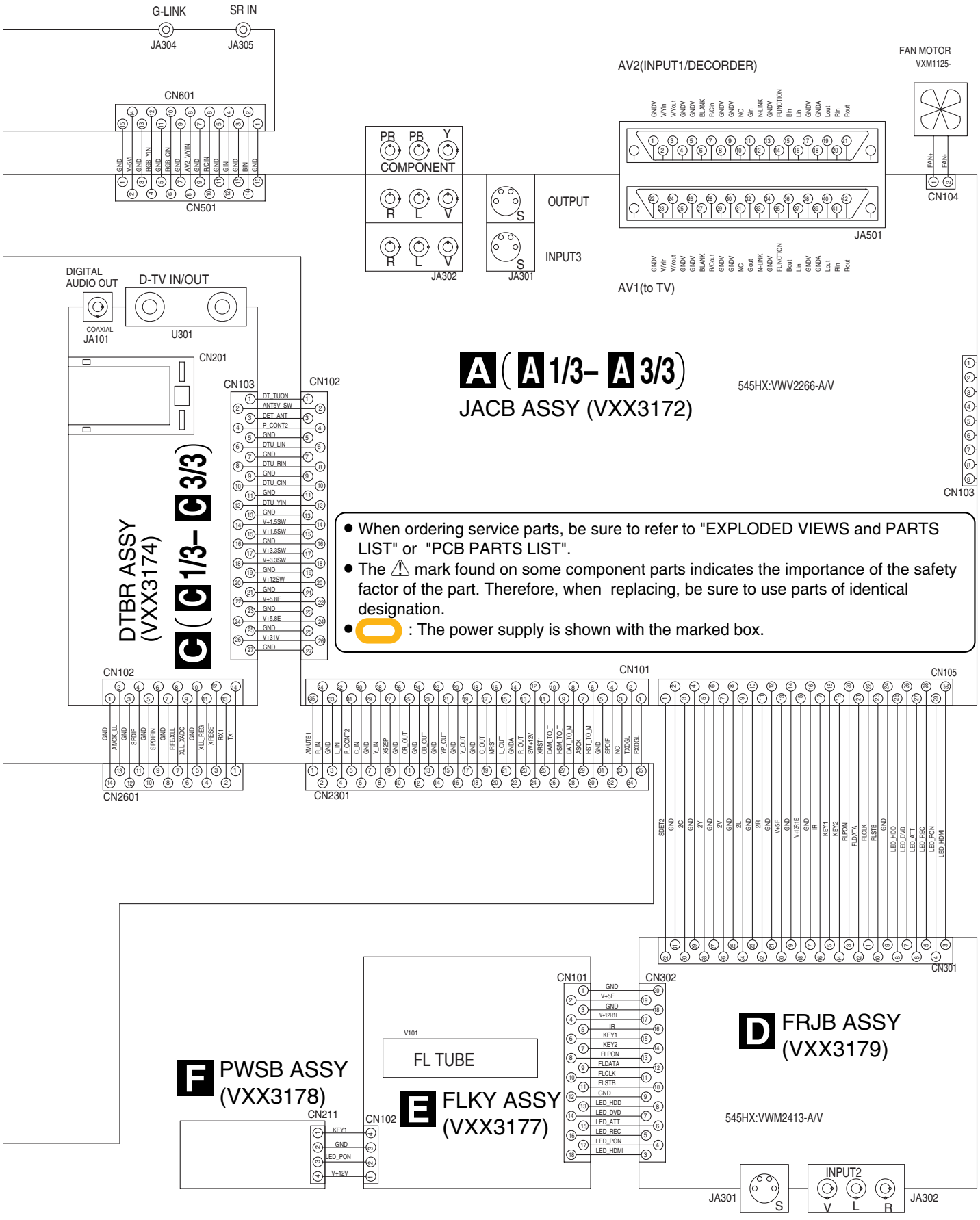
3.1.1 OVERALL BLOCK DIAGRAM




C
DTBR ASSY
SDRAM 256Mbit
EMMMA2LL
27MHz
Flash 32Mbit
CN103
OFDM DEM IC STV0361
SCL/SDA
AGC
Euro Digita Terrestrial Tuner
IN
OUT
MPEG2-TS
SPDIF
SW
JA101
COAXIAL Digital out
SPDIF RFE
RFE/XLL
SPDIF IN
LRCKO
BCKO
ADATAO
AMCK
AMCK_LL
DAC PCM1742
CN102
CN2601
CN2301
IC6091 SW
IC6092 SW
SPDIF_HDMI
USBRST
USB CONTROL TDOTG242-0F0C8
CN5601
CN101
JA101
USB
J
USBB ASSY
RFE/XLL_AMCK
TXDGL
RXDGL
GPIO
UART/(RESET)
Optical Signal SW
27MHz
33/36HDMI
DACCLKO
SPDIFO
DDR SDRAM 512Mbit
DDR SDRAM 512Mbit
CVBS/Y
DV V/Y IN
VIDEO SW MM1503XN
DV C IN
VIDEO SW MM1501XN
EMMA2RFE
DRV IC BD799
RF IC UPC3345GC-YEB
LOADER
L
R
A/D PCM1802
LRCKI/BCKI/ADATAI
ADCCLKO
Y
C
Y/G
Cb/B
Cr/R
CN12
CN11
ATAB
HDD
160GB
from POWER
CN3801
CN6001
INT
SELECT SW TC74VHC-157FT
USB_INT
DVINT1
LRCKO
BCKO
ADATAO
DAC PCM1742
AMCK : 33/36M
DACCLKO
SELECT IC TV74VHC157FT
Flash 64Mbit
XHDMI_RST
XPRV_RST
HDMI_XDVI
XHDMI_INT
XRESET
SDA
SCL
TBIRD CPU PDC147AB
INT2
CN101
PD[0:8]
HSYNC
VSYNC
PROV CD0041AF
HDMI TX SII9030CTU
CN201
HDMI
BCK
LRCK
SD
SPDIF
AMCK_HDMI
SDRAM 16M
H
HDMIB ASSY
CN2401
CN3802
CN201
CN202
L
POWER SUPPLY UNIT
to HDD
CN101
DVRST
SDA
SCL
DV Y/V IN
DV C IN
AMCLKI (STBY)
DVADATAI
DVBCKI
DVLRCKI
INT2/UART2/
VENC IC IC101 ADV7172KSTZ-K
LINK/DVCODEC IC102 UPD72893BF1-FN3-K
PHY IC108 UPD72852AGB-8EU
16M SDRAM IC103 K4S161622H-TC60-K
JA101
DVout
I
DVJB ASSY
CN101
FAN

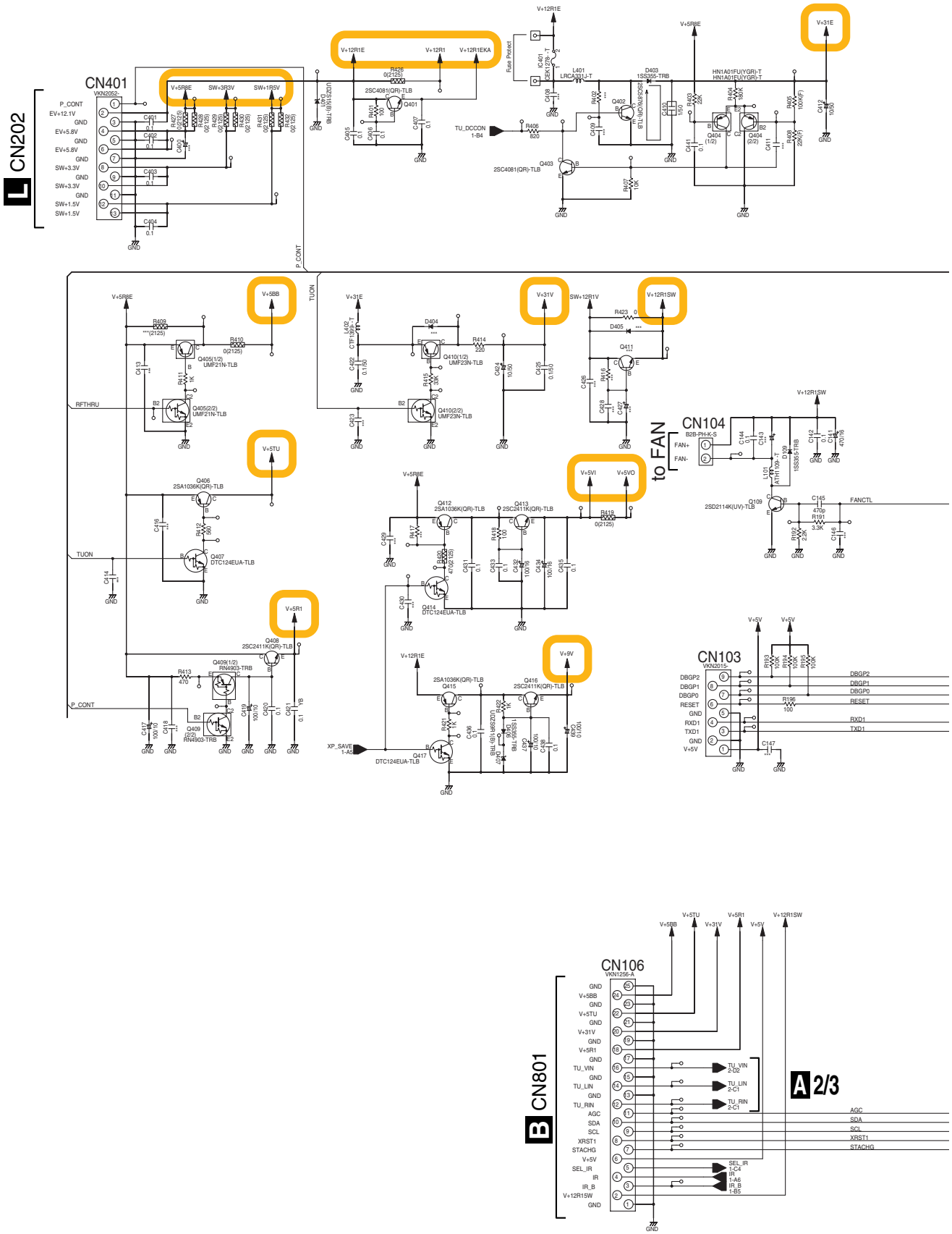
3.2 OVERALL WIRING DIAGRAM



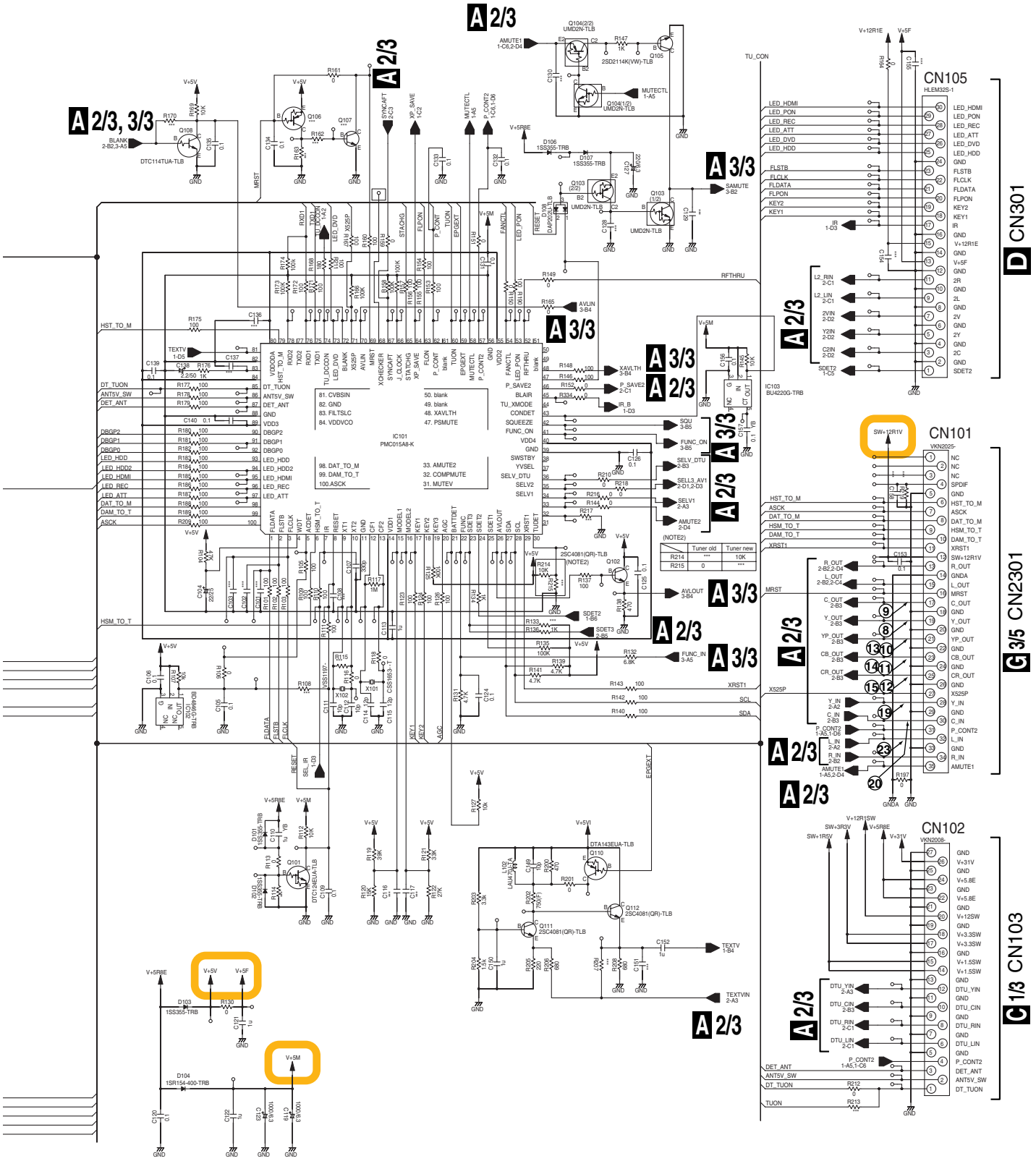


- When ordering service parts, be sure to refer to "EXPLODED VIEWS and PARTS LIST" or "PCB PARTS LIST".
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- : The power supply is shown with the marked box.

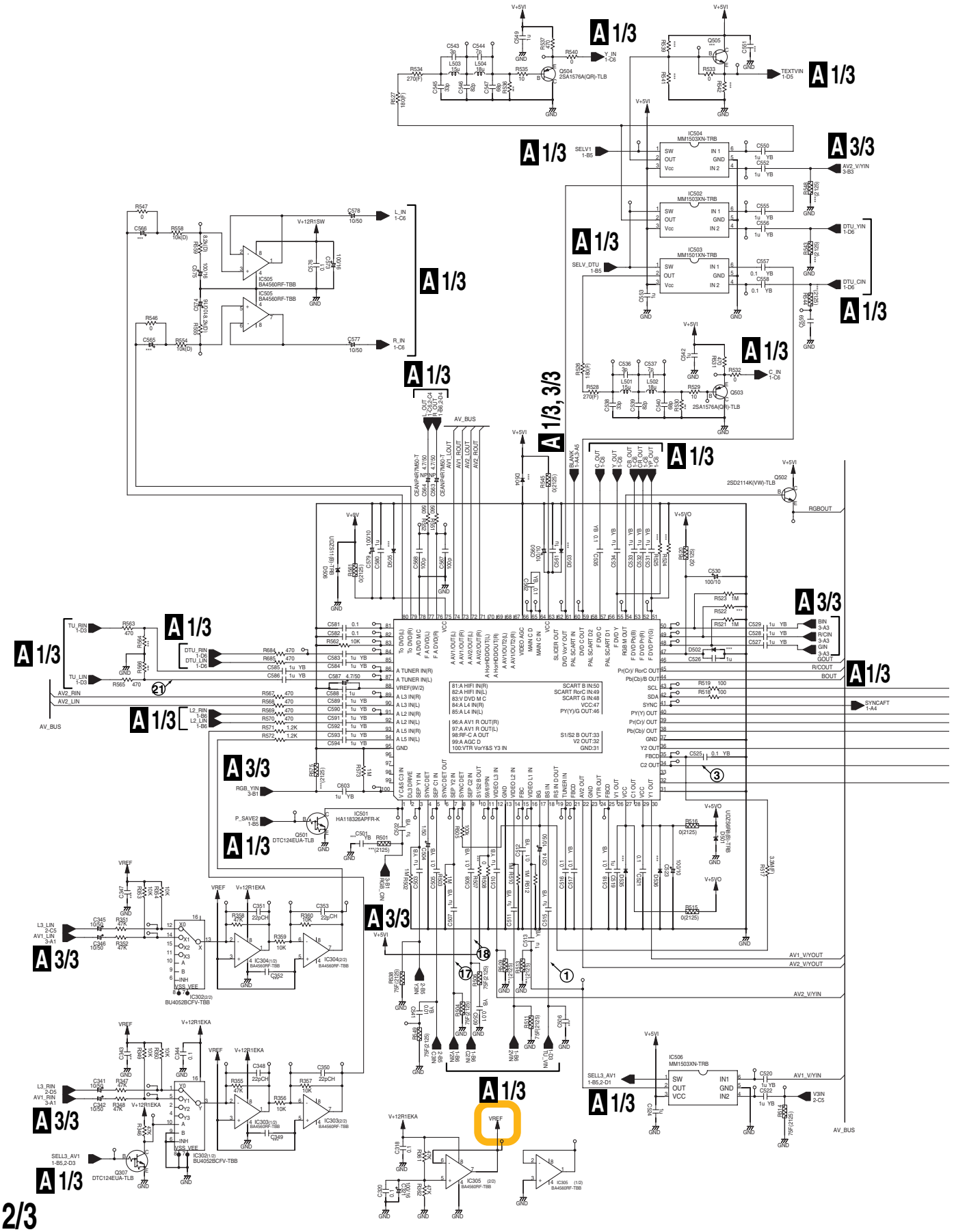
3.3 JACB ASSY (1/3)



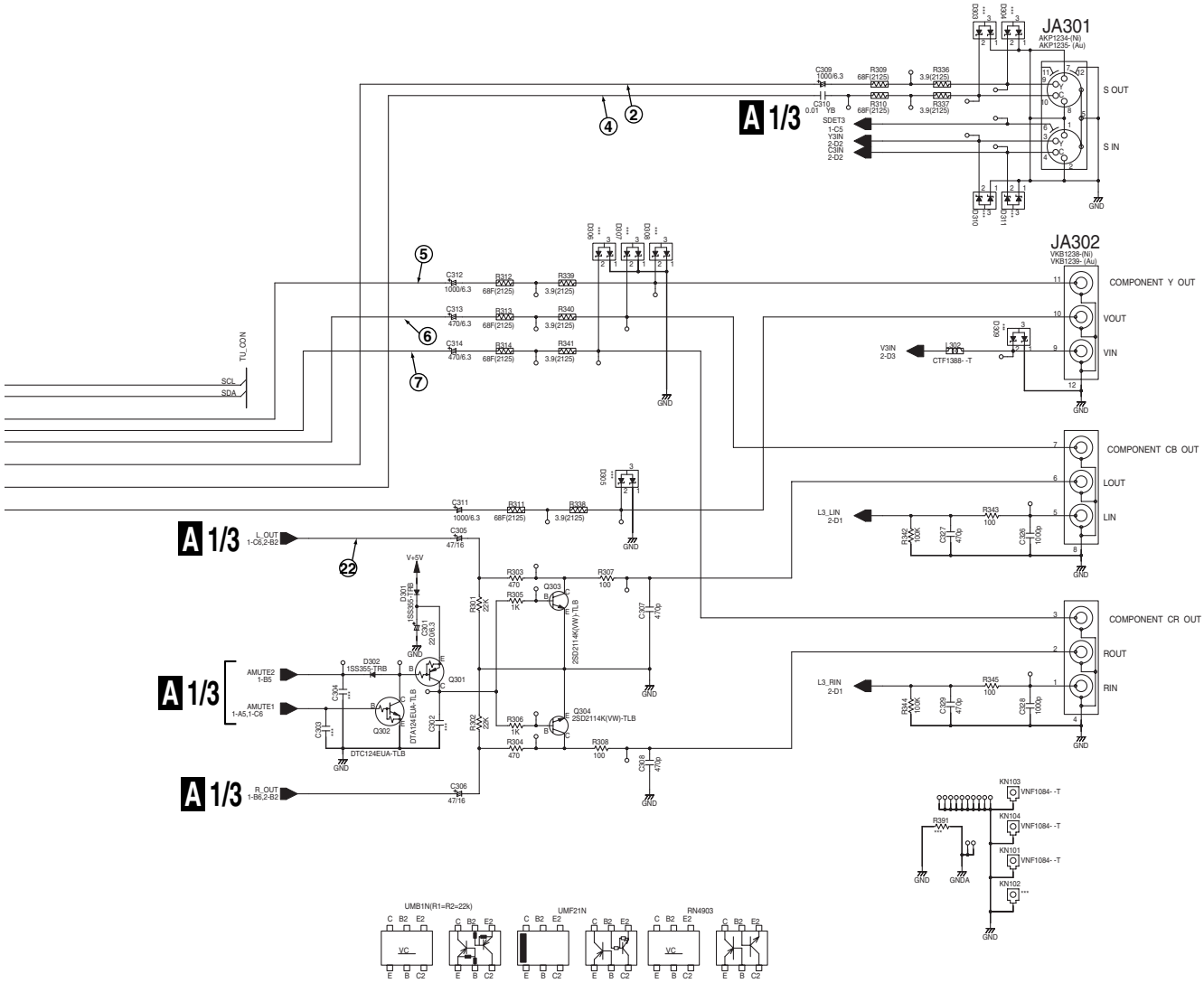
A 1/3 JACB ASSY (VXX3172)



3.4 JACB ASSY (2/3)

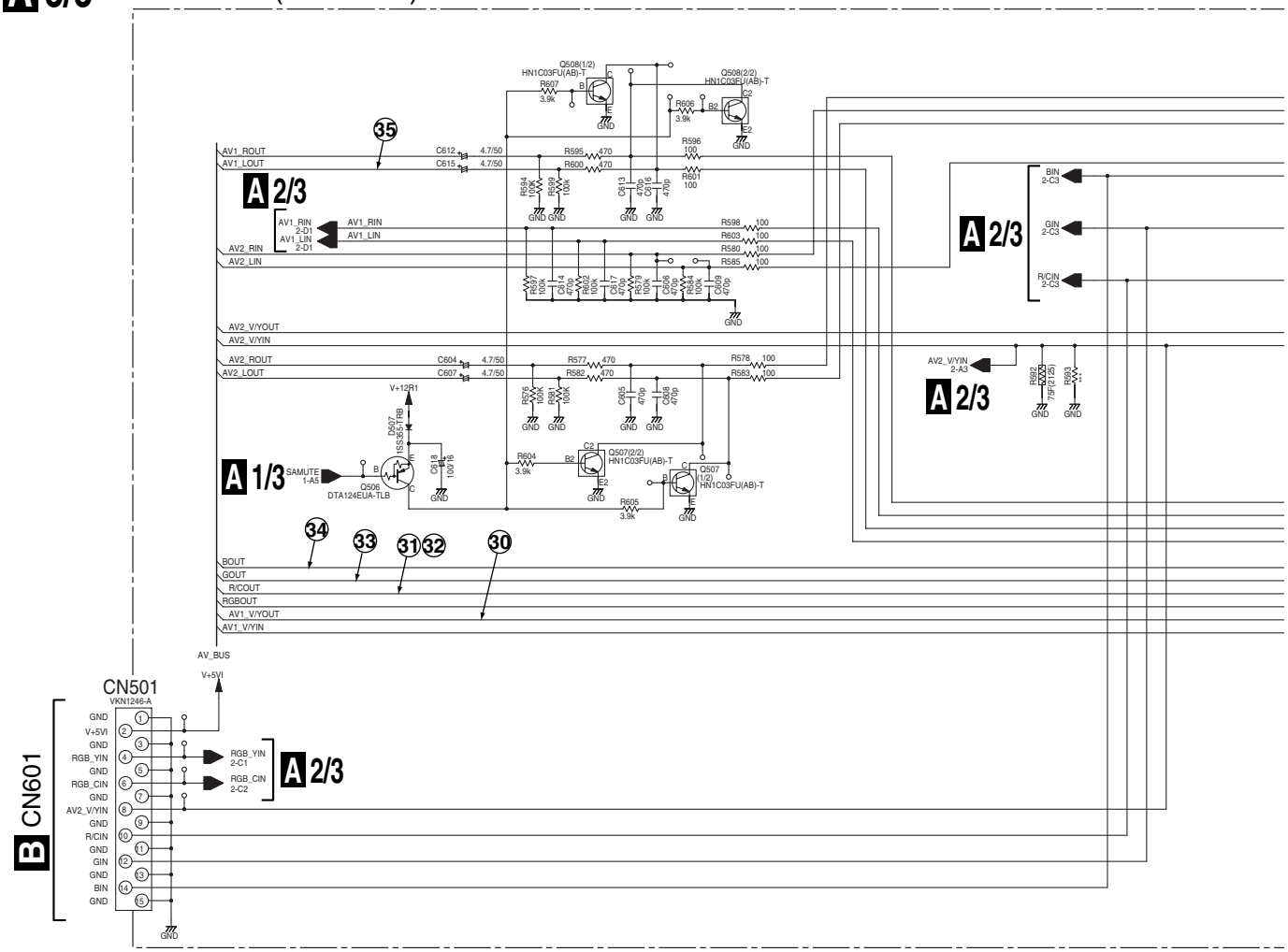


A 2/3 JACB ASSY (VXX3172)

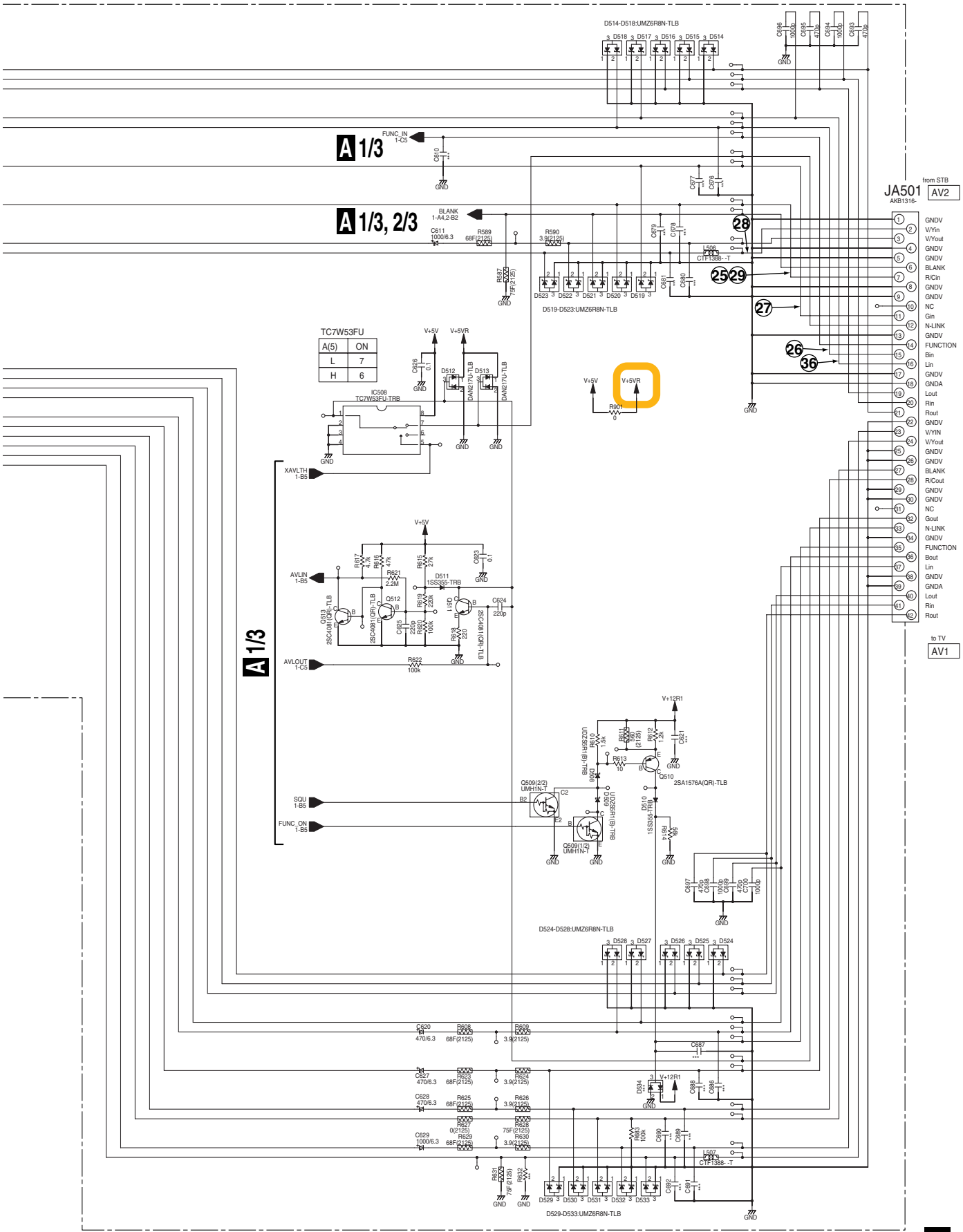


3.5 JACB ASSY (3/3)

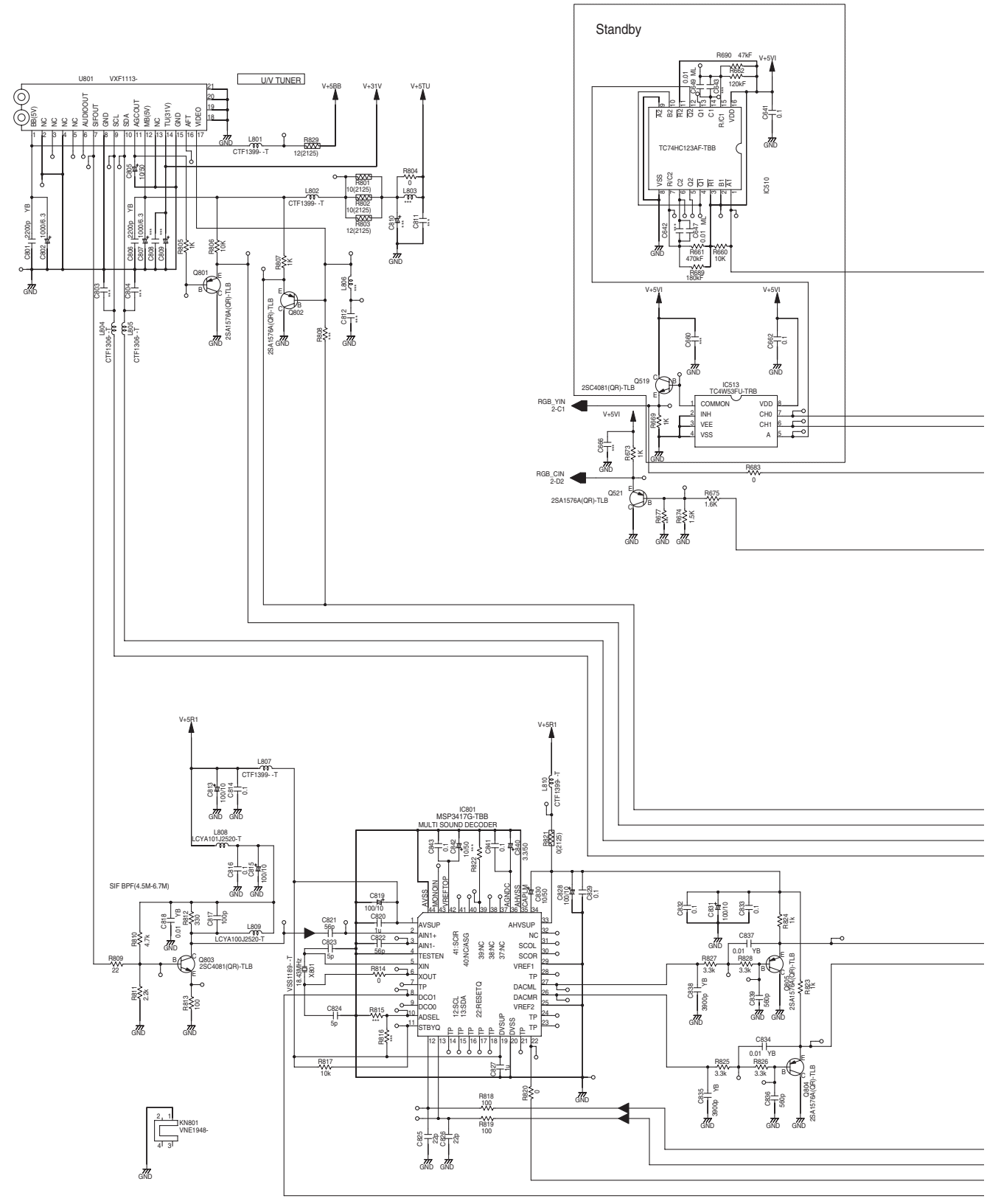
A 3/3 JACB ASSY(VXX3172)



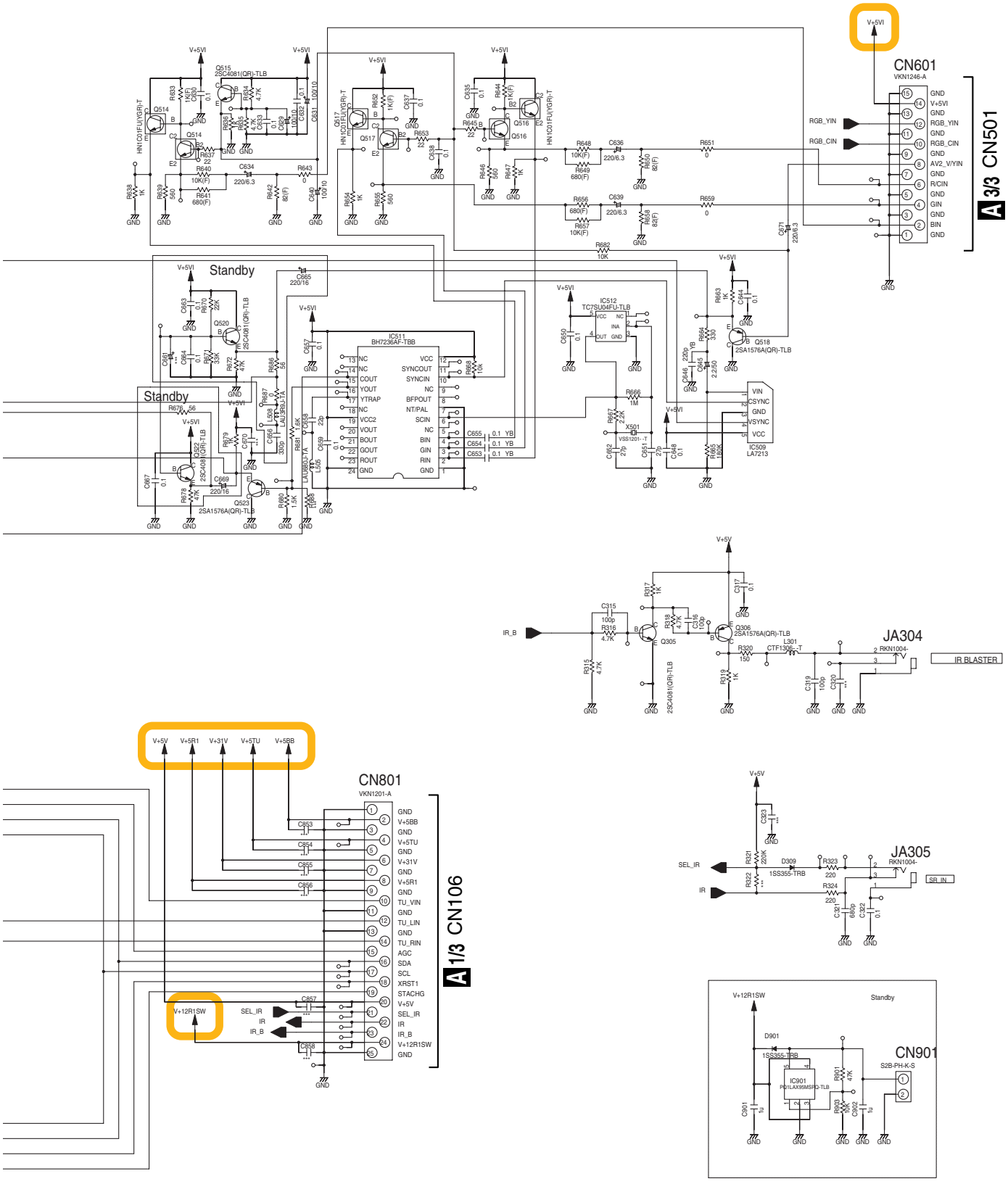
A 3/3


A 1/3
A 1/3, 2/3
A 1/3
A 3/3
JA501
AKB1316-
from STB
AV2
to TV
AV1
TC7W53FU
IC508
TC7W53FU-TRB
D514-D518:UMZ6R8N-TLB
D519-D523:UMZ6R8N-TLB
D524-D528:UMZ6R8N-TLB
D529-D533:UMZ6R8N-TLB
FUNC_IN
BLANK
XAVLTH
AVLIN
AVLOUT
SQU
FUNC_ON
V+5V
V+5VR
V+12R1
GND
GNDV
V/Yin
V/Yout
BLANK
R/Cin
NC
Gin
N-LINK
FUNCTION
Bin
Lin
GNDA
Lout
Rin
Rout
R/Cout
Gout
Bout
DVR-545HX-S
25

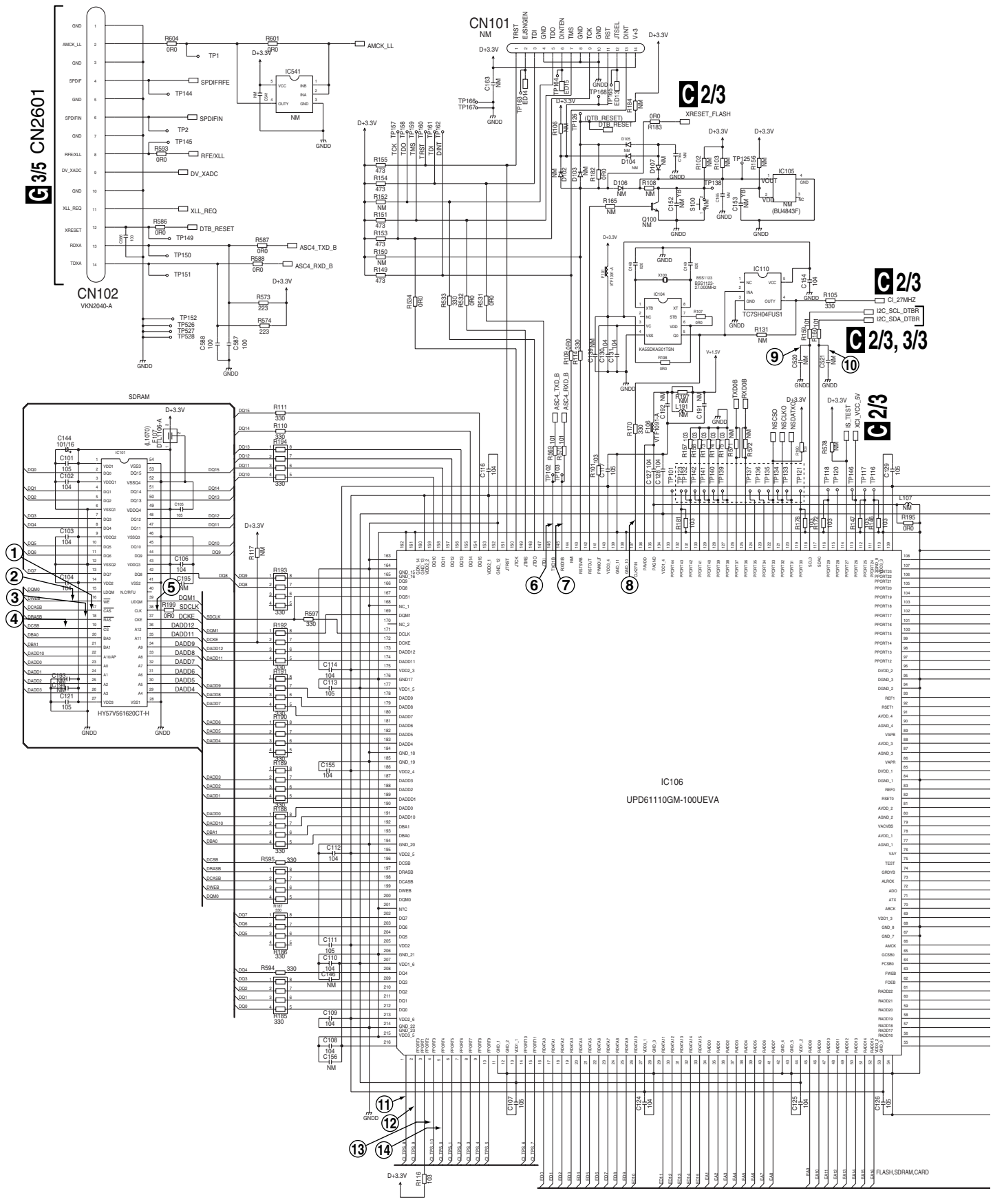
3.6 TUNB ASSY


U801 VXF1113-
U/V TUNER
V+5BB
V+31V
V+5TU
L801 CTF1399- -T
R829 12(2125)
L802 CTF1399- -T
R804 0
L803
R801 10(2125)
R802 10(2125)
R803 12(2125)
C810
C811
C801 220p YB
C802 1000/6.3
C803
C804
C805
C806 220p YB
C807 1000/6.3
C808
C809
R805 1K
R806 10K
R807 1K
Q801 2SA1576A(QR)-TLB
Q802 2SA1576A(QR)-TLB
L806
C812
R808 1K
L804 CTF1306- -T
L805 CTF1306- -T
Standby
R690 47kF
R691 120kF
V+5VI
TC74HC123AF-TBB
IC510
C641 0.1
C642 0.01 ML
C643 0.49 ML
C644 0.01
C645 0.01 ML
R661 470kF
R660 10K
R659 180kF
C660
C662 0.1
Q519 2SC4081(QR)-TLB
IC513 TC4W53FU-TRB
COMMON
INH
VEE
VSS
VDD
CH0
CH1
A
RGB_YIN 2-C1
R669 1K
C666
R673 1K
RGB_CIN 2-D2
R683 0
Q521 2SA1576A(QR)-TLB
R675 1.6K
R677
R674 1.5K
V+5R1
L807 CTF1399- -T
C813 100/10
C814 0.1
L808 LCYA101J2520-T
C816 0.1
C815 100/10
L809 LCYA100J2520-T
SIF BPF(4.5M-6.7M)
C818 0.01 YB
R812 330
C817 100p
R810 4.7K
R809 22
Q803 2SC4081(QR)-TLB
R811 2.2K
R813 100
IC801
MSP3417G-TBB
MULTI SOUND DECODER
C819 100/10
C820
C821 56p
C822 1u
C823 5p
C824 5p
R814 0
R815
R816
R817 10k
VSS1189- -T
18.432MHz
X801
C827
R818 100
R819 100
R820 0
C825 22p
C826 22p
KN801 VNE1948-
L810 CTF1399- -T
R821 0(2125)
C832 0.1
C831 100/10
C833 0.1
R824 1k
C837 0.01 YB
R827 3.3k
R828 3.3k
Q805 2SA1576A(QR)-TLB
R829 1k
C838 3900p YB
C839 560p
C834 0.01 YB
R825 3.3k
R826 3.3k
Q804 2SA1576A(QR)-TLB
C835 3900p YB
C836 560p

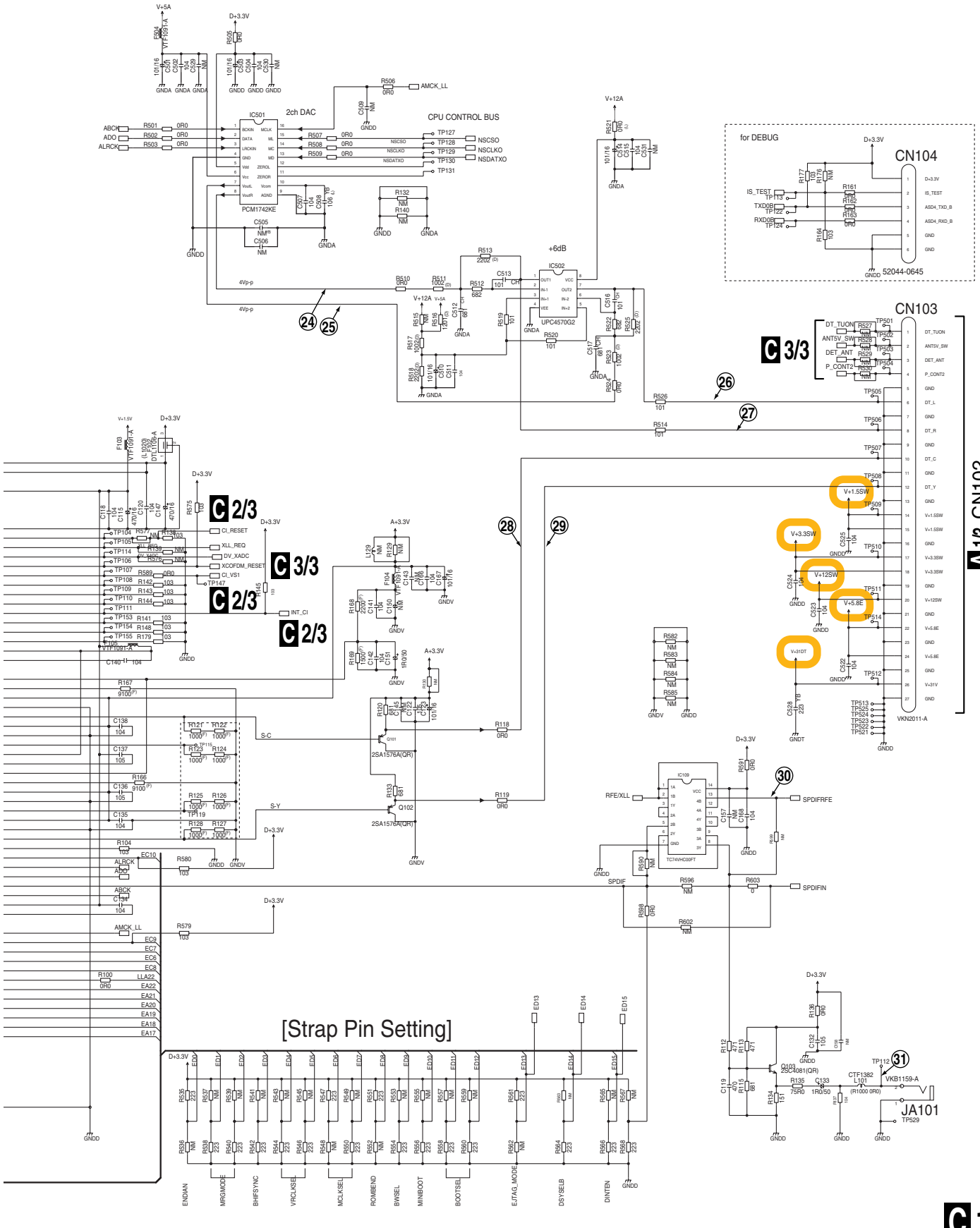
B TUNB ASSY (VWV2262)



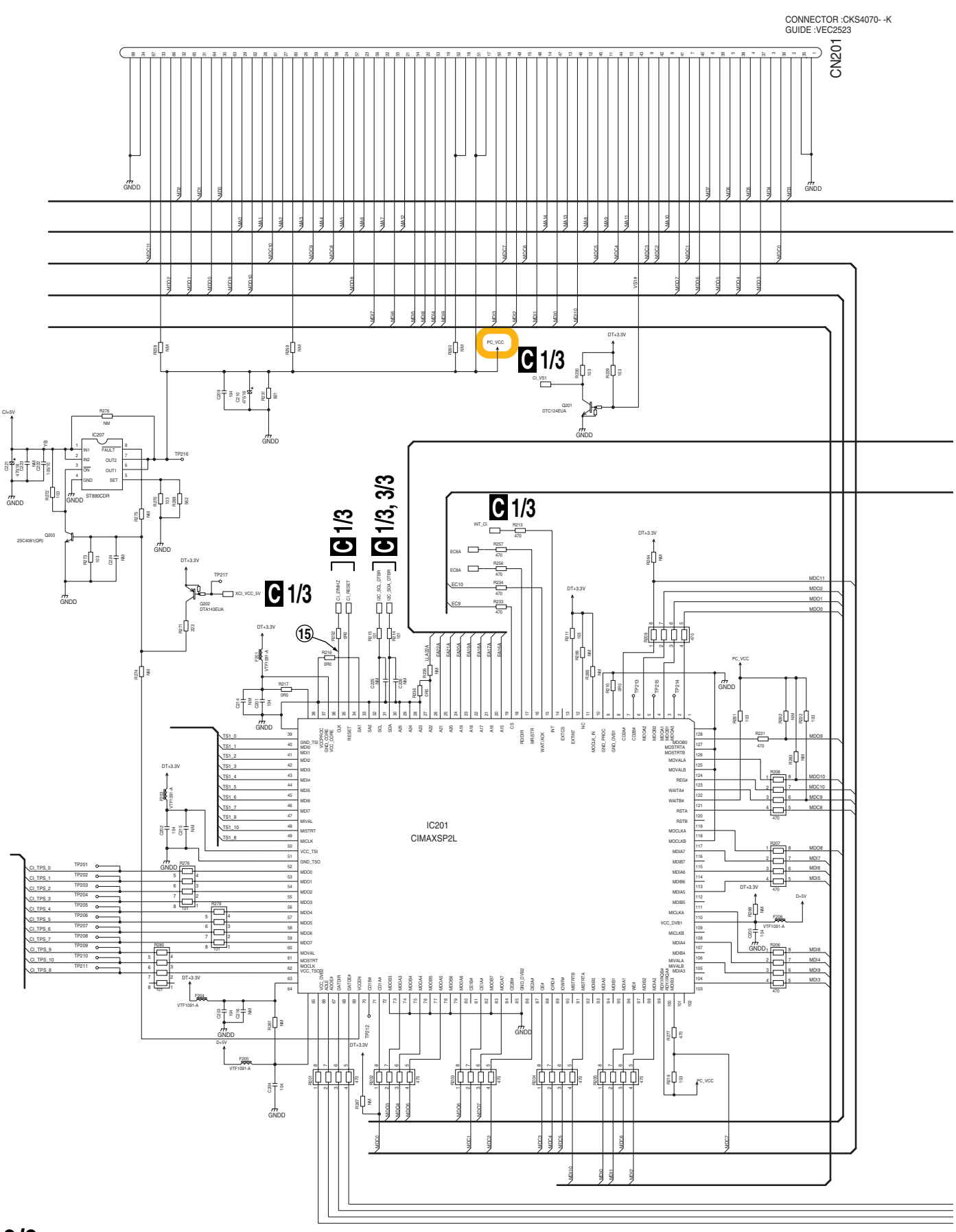
3.7 DTBR ASSY (1/3)



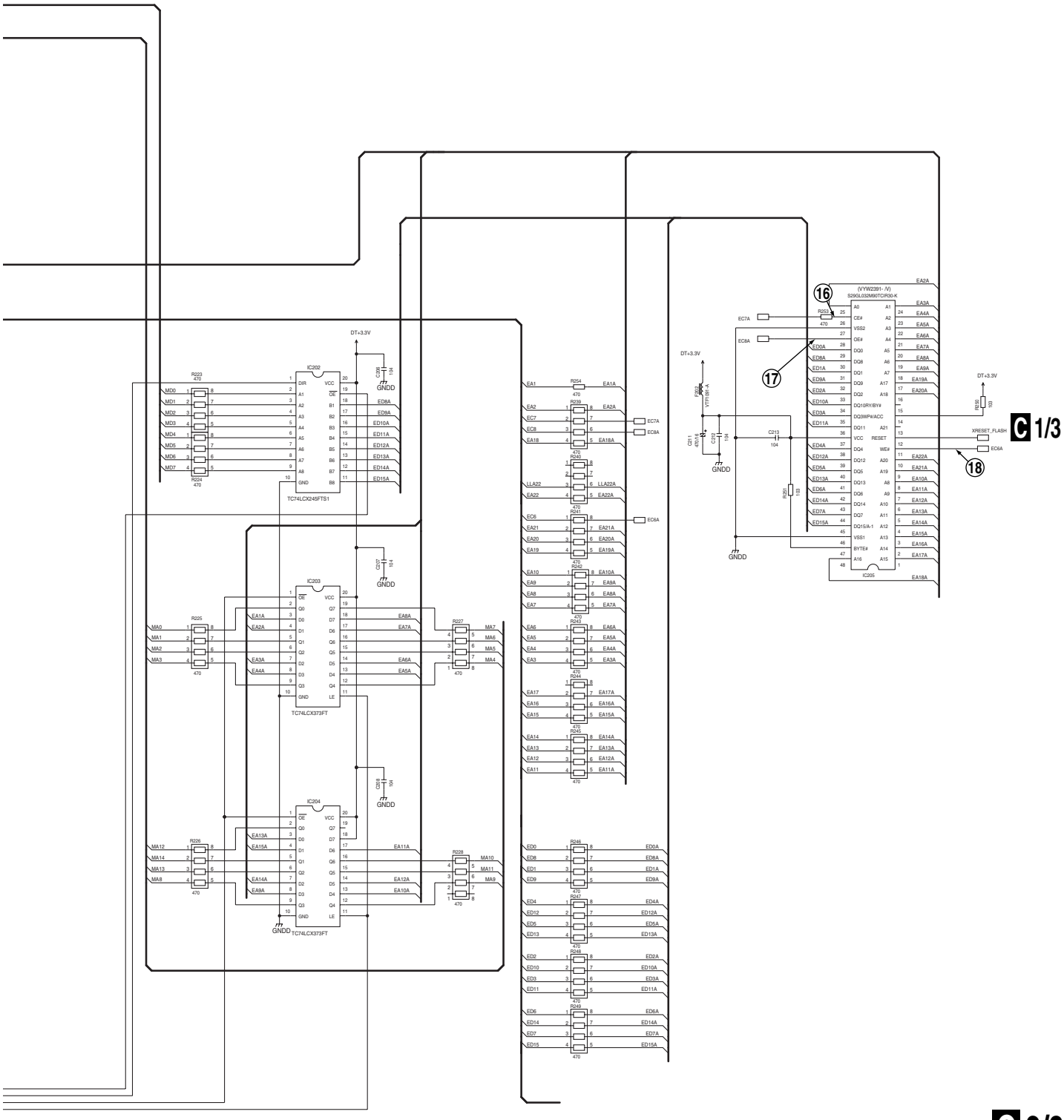
C 1/3 DTBR ASSY (VXX3174)



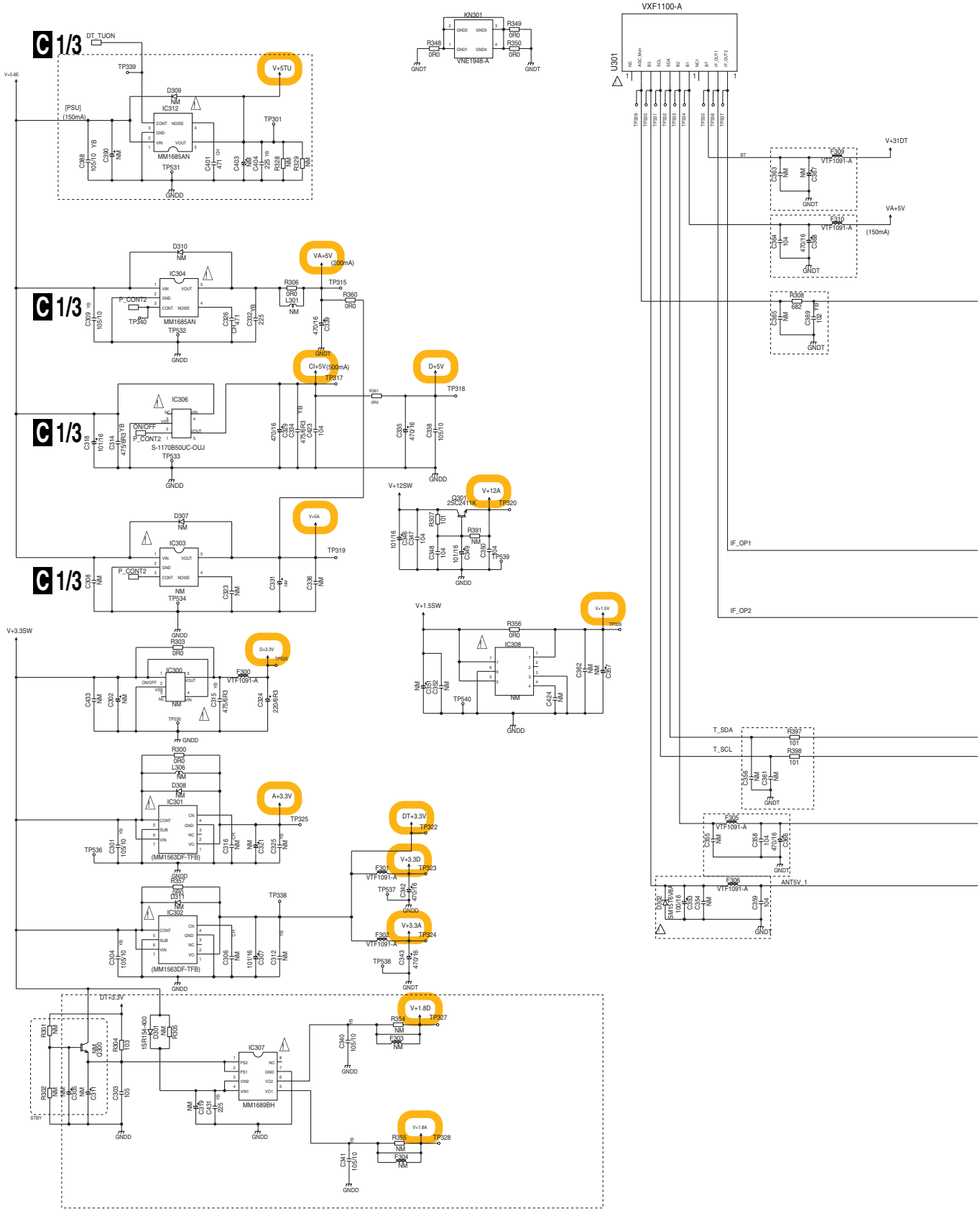
3.8 DTBR ASSY (2/3)



C 2/3 DTBR ASSY (VXX3174)

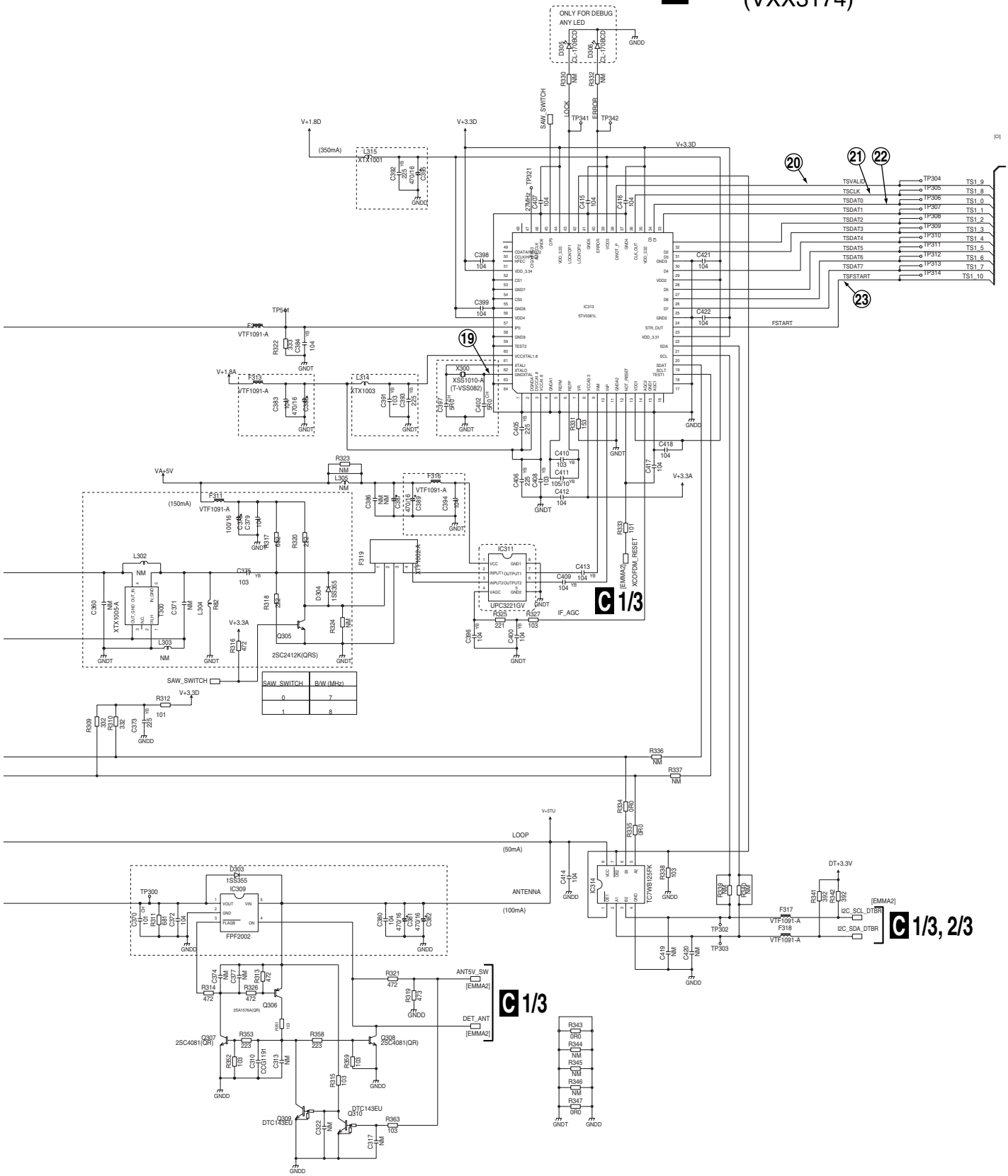


3.9 DTBR ASSY (3/3)

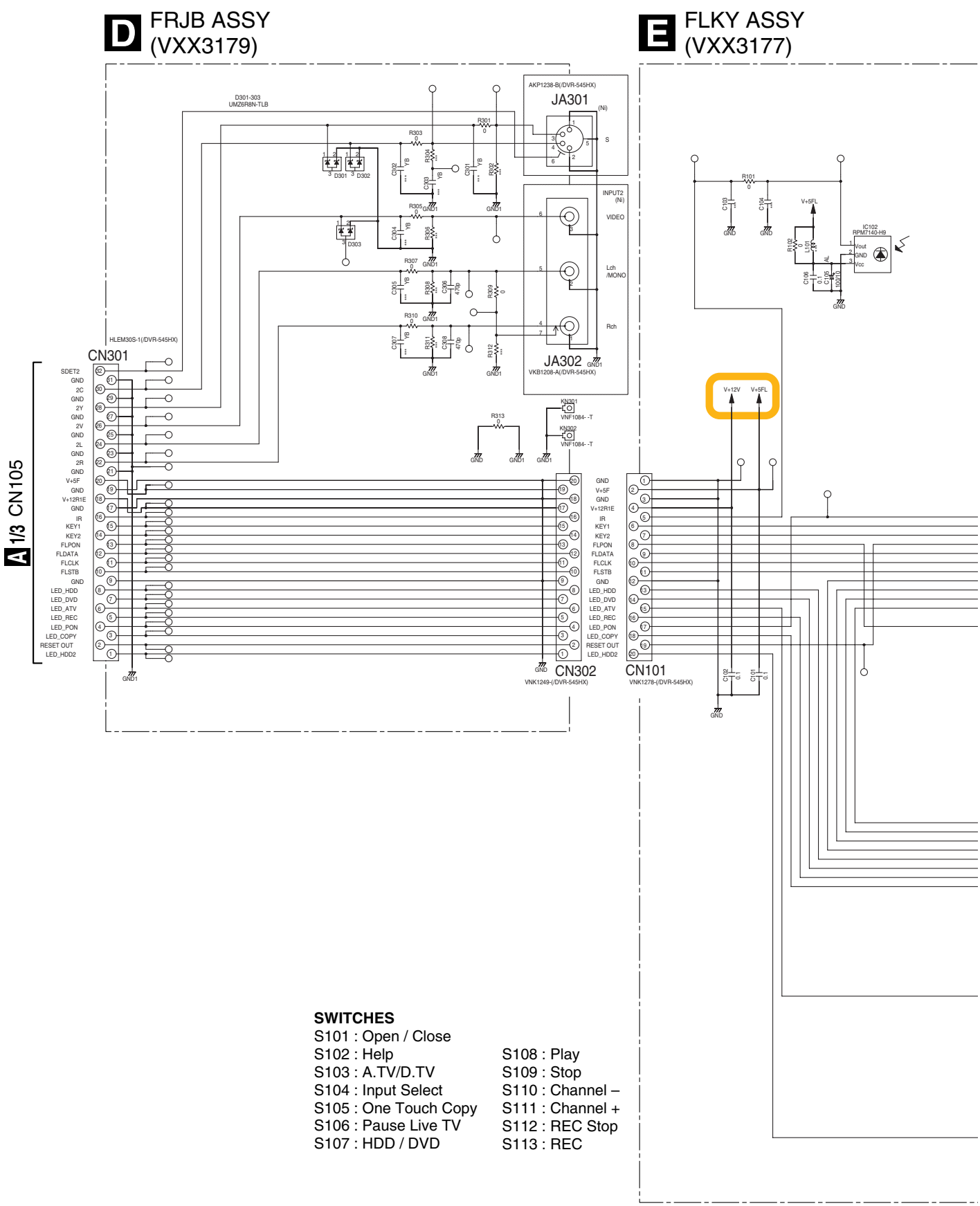


C 3/3

C 3/3 DTBR ASSY (VXX3174)



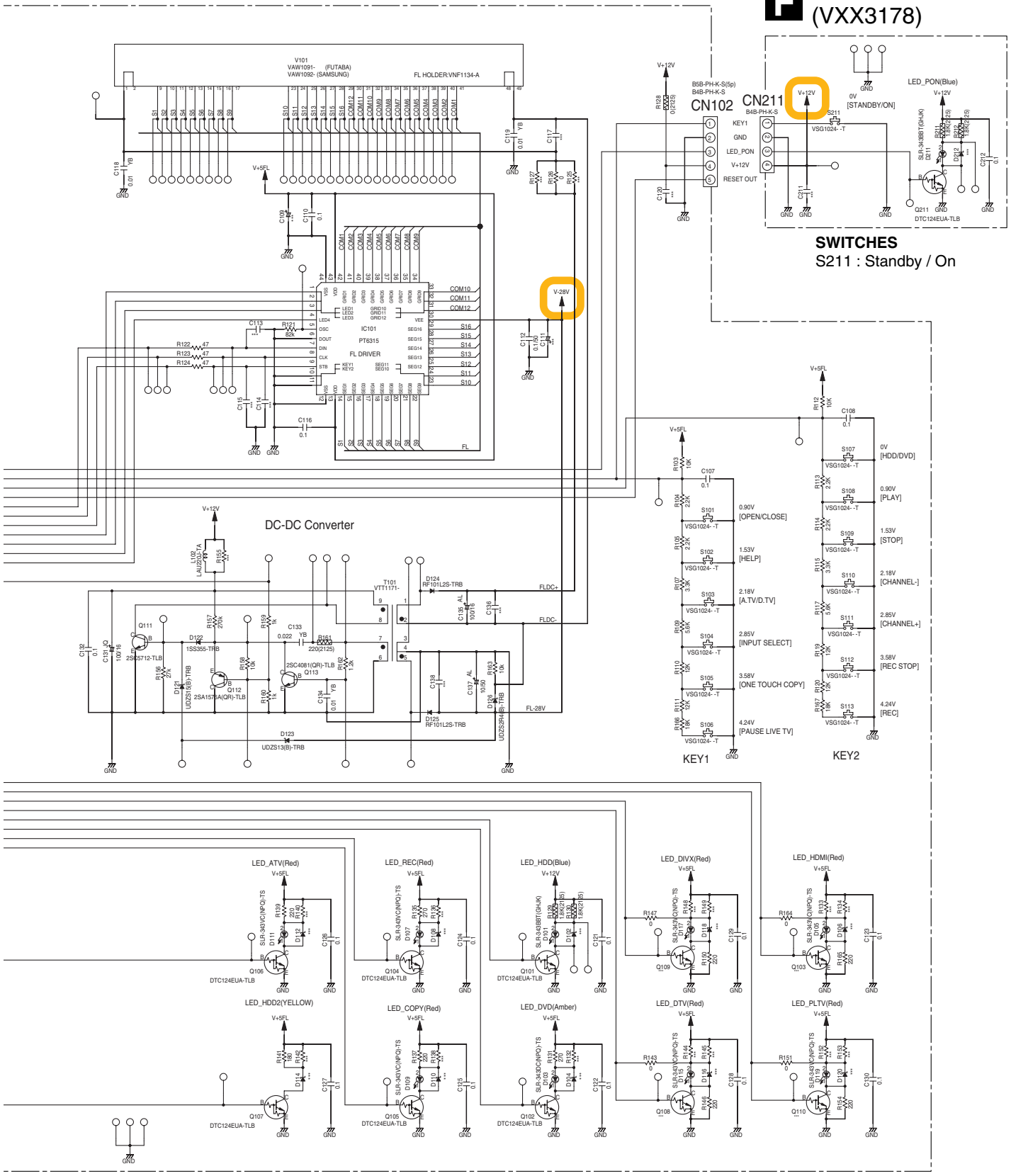
3.10 FRJB, FLKY and PWSB ASSYS



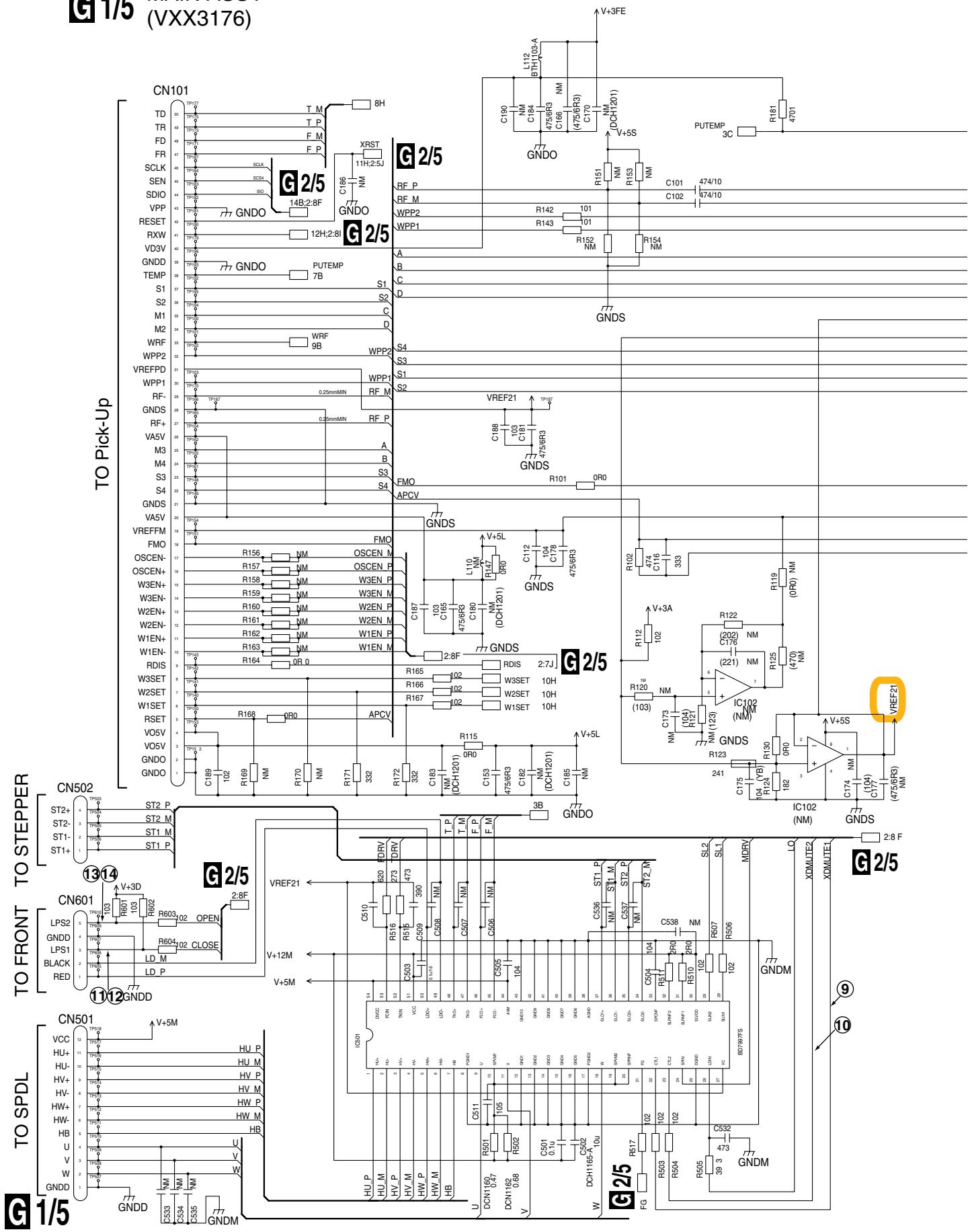
SWITCHES

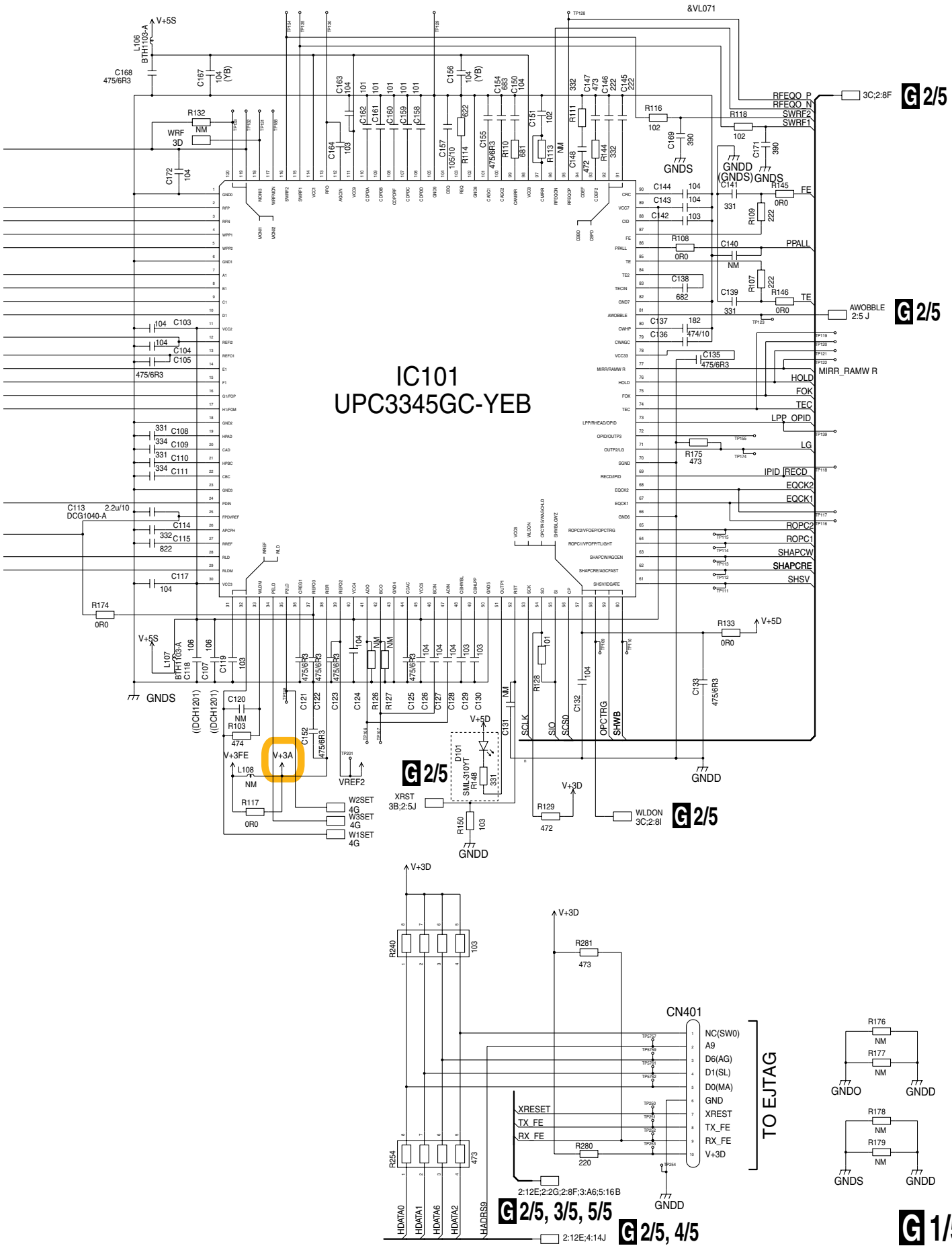
S101 : Open / Close
S102 : Help
S103 : A.TV/D.TV
S104 : Input Select
S105 : One Touch Copy
S106 : Pause Live TV
S107 : HDD / DVD
S108 : Play
S109 : Stop
S110 : Channel –
S111 : Channel +
S112 : REC Stop
S113 : REC

F PWSB ASSY (VXX3178)

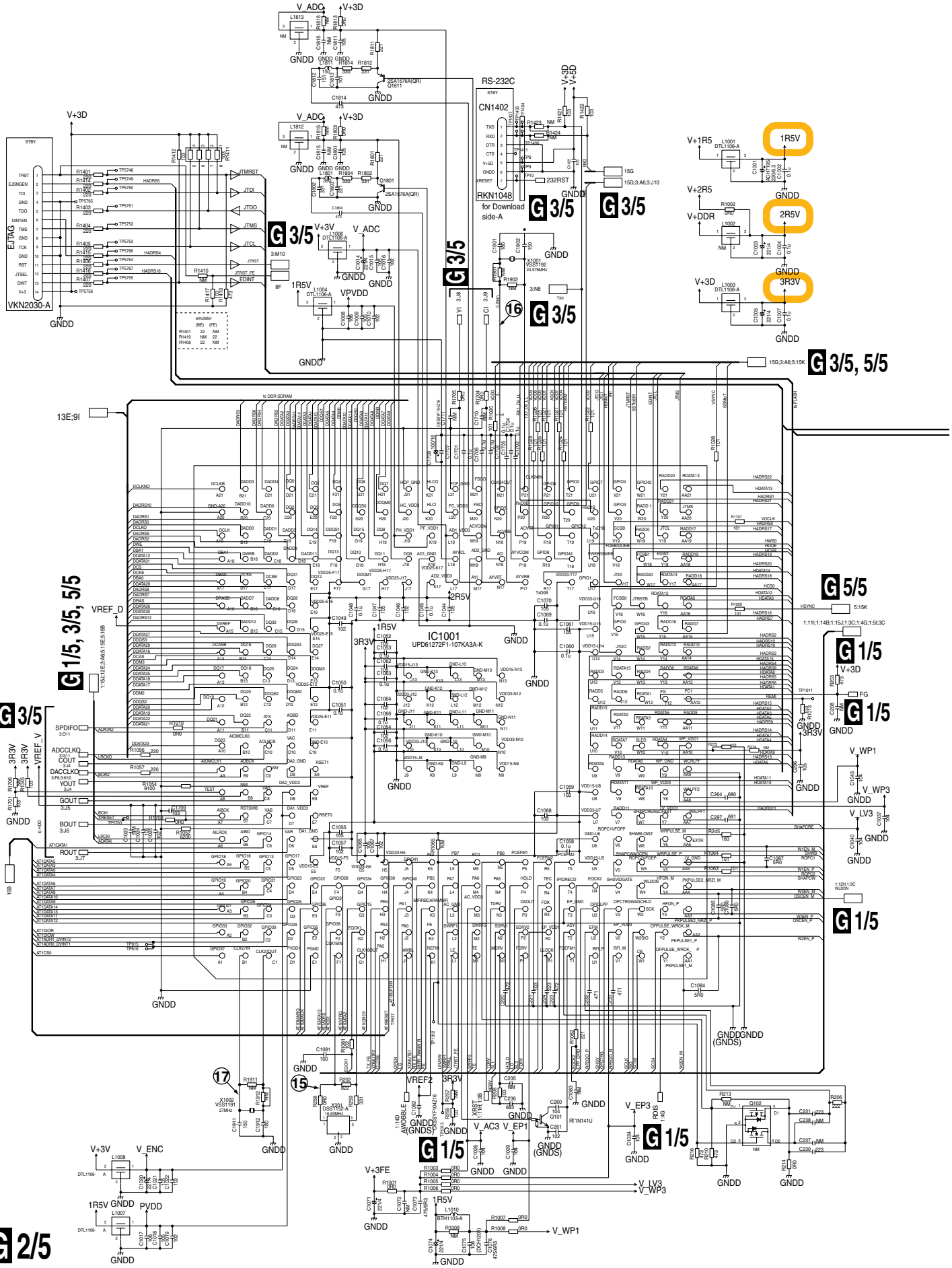


G 1/5 MAIN ASSY (VXX3176)

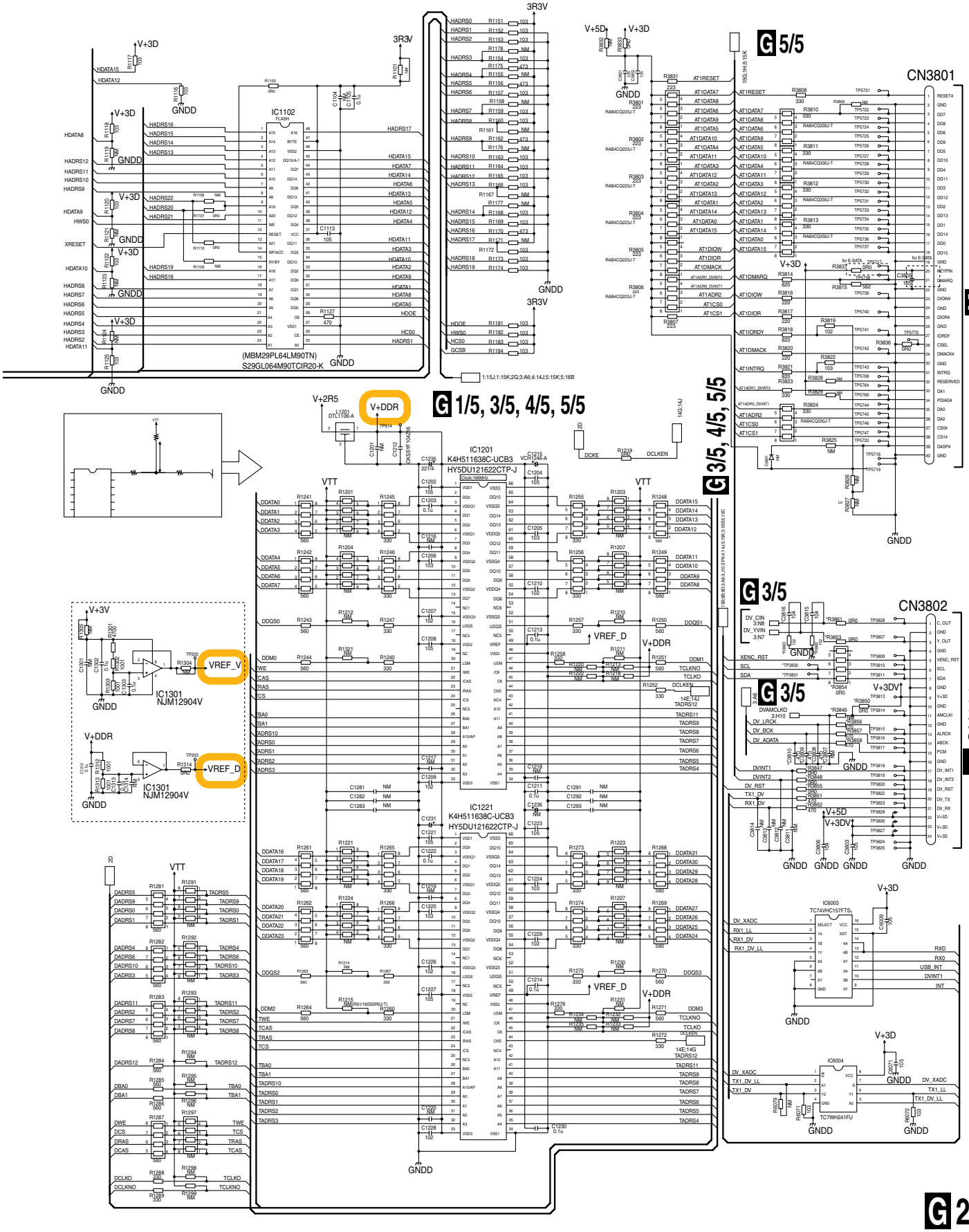



IC101
UPC3345GC-YEB
&VL071
V+5S
V+5D
V+3D
V+3A
V+3FE
GNDS
GNDD
GNDO
MIRR_RAMW R
HOLD
FOK
TEC
LPP_OPID
LG
IPID
RECD
EQCK2
EQCK1
ROPC2
ROPC1
SHAPCW
SHAPCRE
SHSV
RFEQO_P
RFEQO_N
SWRF2
SWRF1
PPALL
FE
TE
AWOBBLE
2:5 J
3C;2:8F
WLDON
3C;2:8I
XRST
3B;2:5J
W2SET
4G
W3SET
4G
W1SET
4G
VREF2
SML-310YT
D101
SCLK
SIO
SCS0
OPCTRG
SHWB
CN401
NC(SW0)
A9
D6(AG)
D1(SL)
D0(MA)
GND
XREST
TX_FE
RX_FE
V+3D
TO EJTAG
XRESET
TX_FE
RX_FE
2:12E;2:2G;2:8F;3:A6;5:16B
2:12E;4:14J
HDATA0
HDATA1
HDATA6
HDATA2
HADRS9
G 2/5
G 2/5, 3/5, 5/5
G 2/5, 4/5
G 1/5

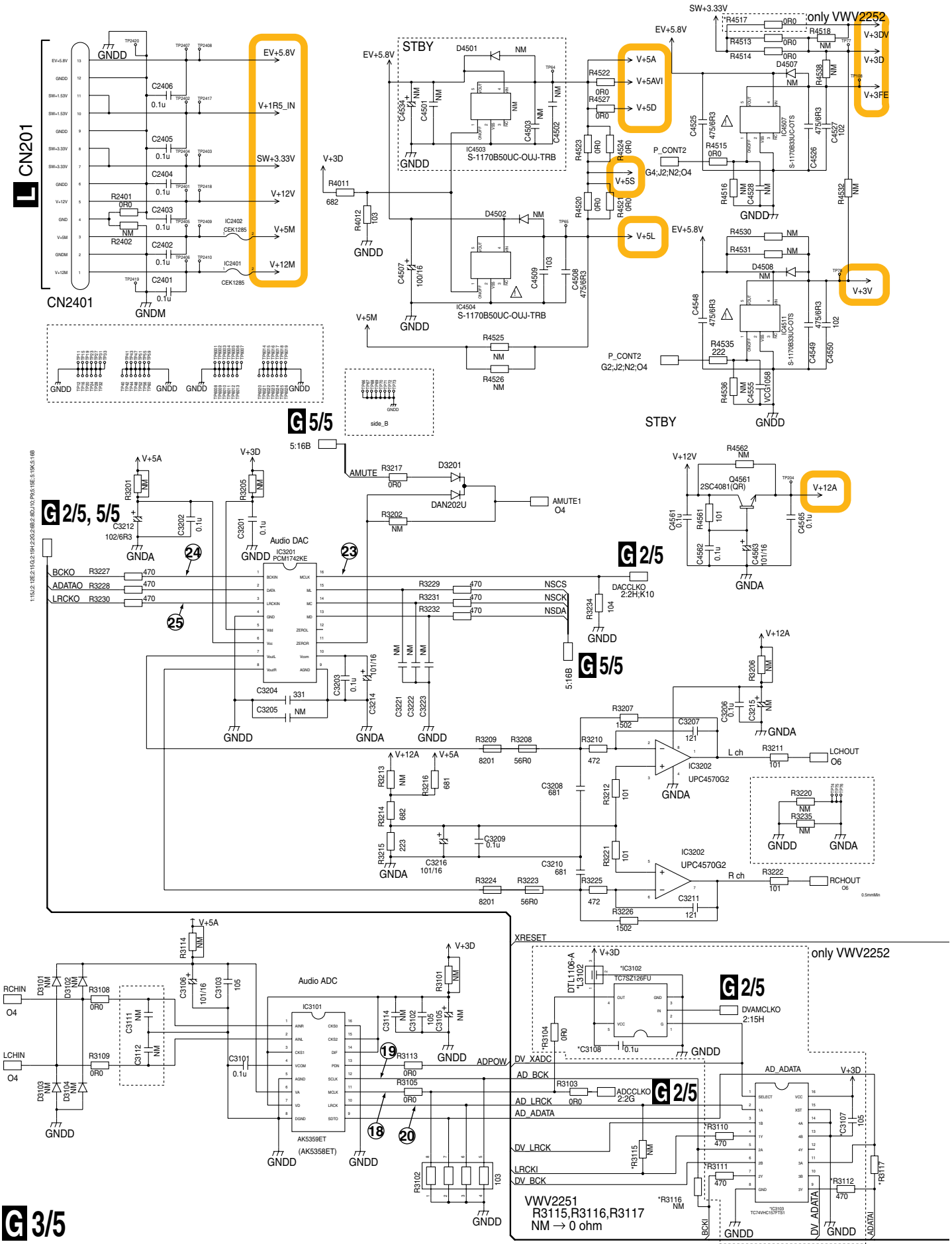
3.12 MAIN ASSY(2/5)

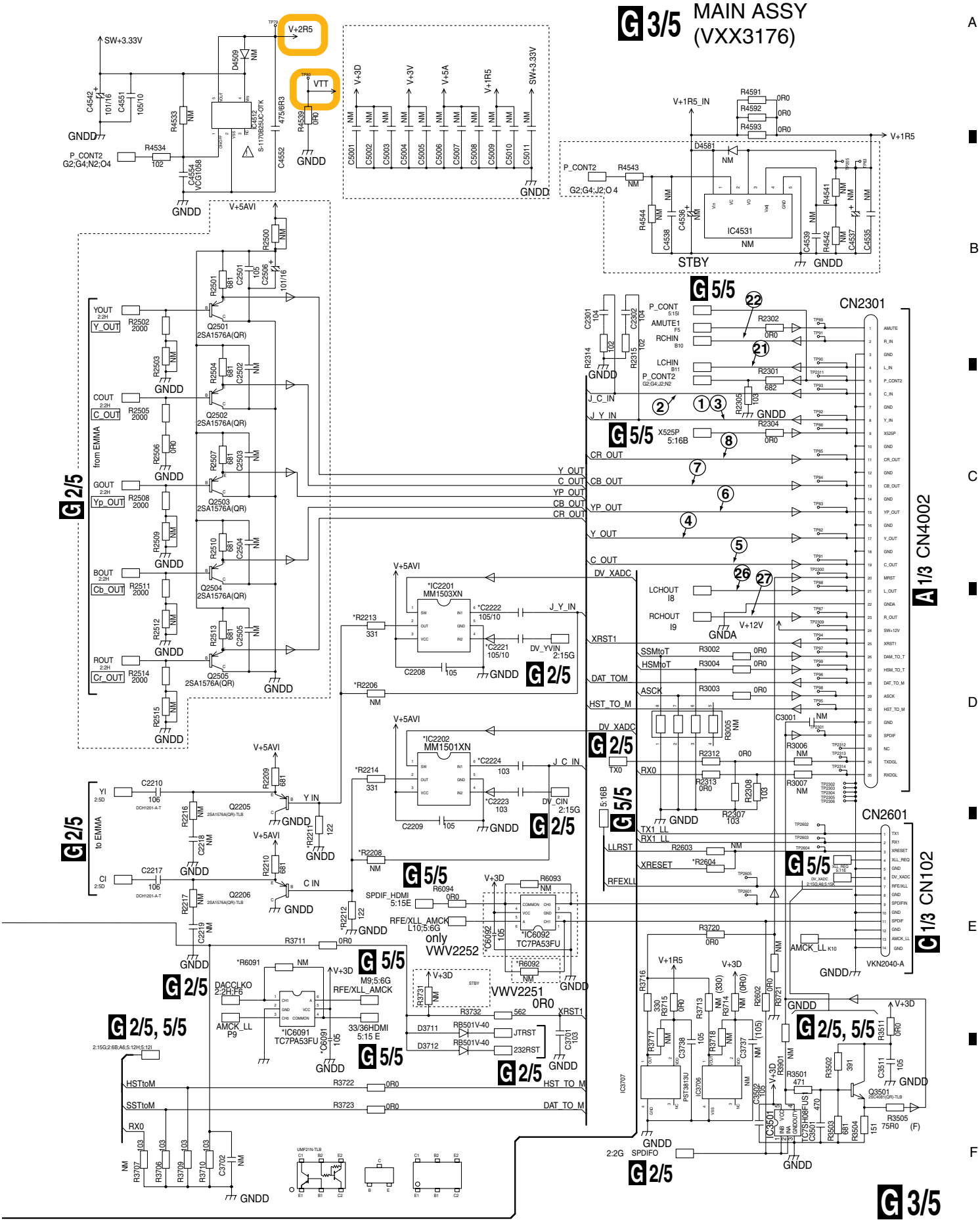


G 2/5 MAIN ASSY (2/5) (VXX3176)

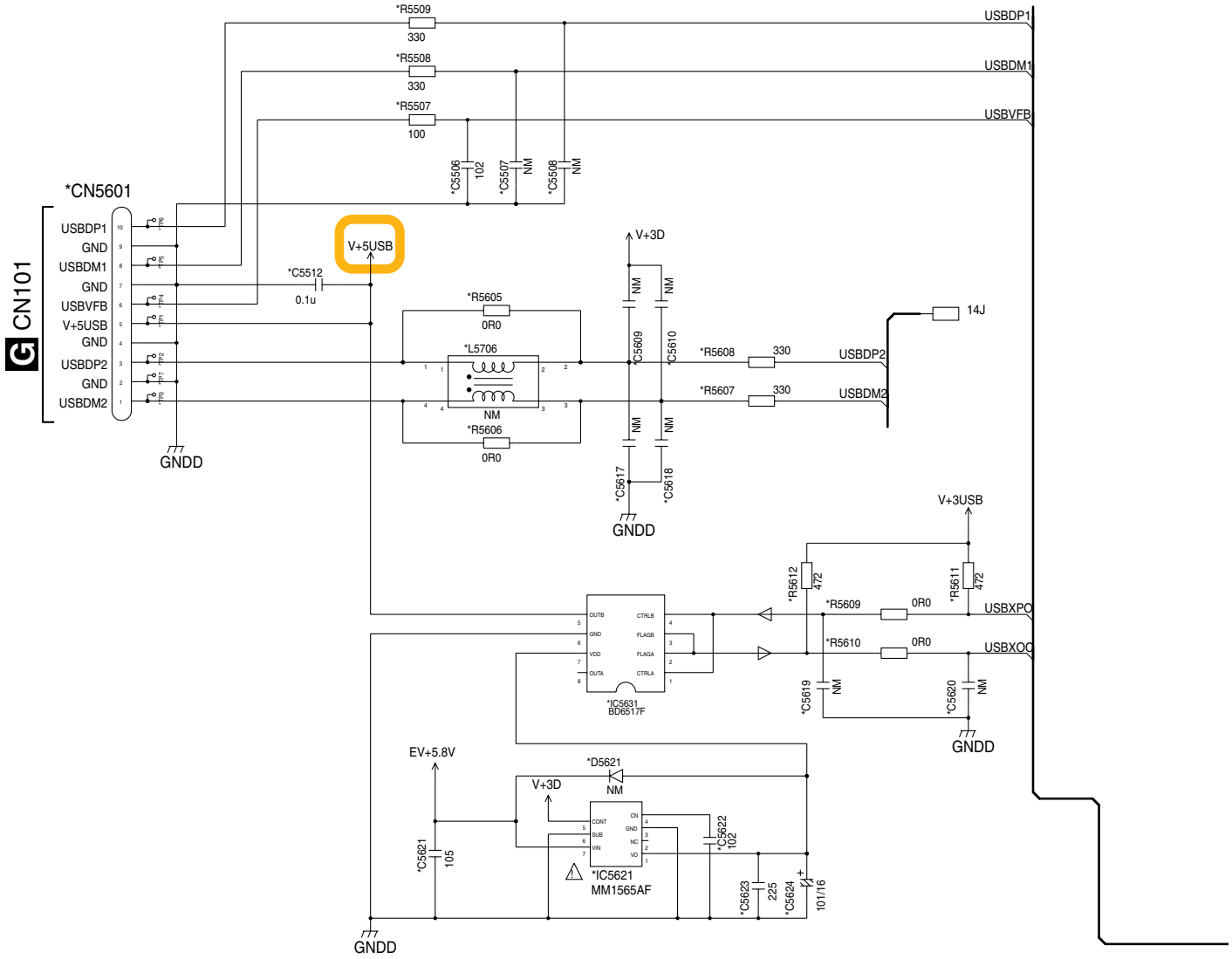


3.13 MAIN ASSY(3/5)



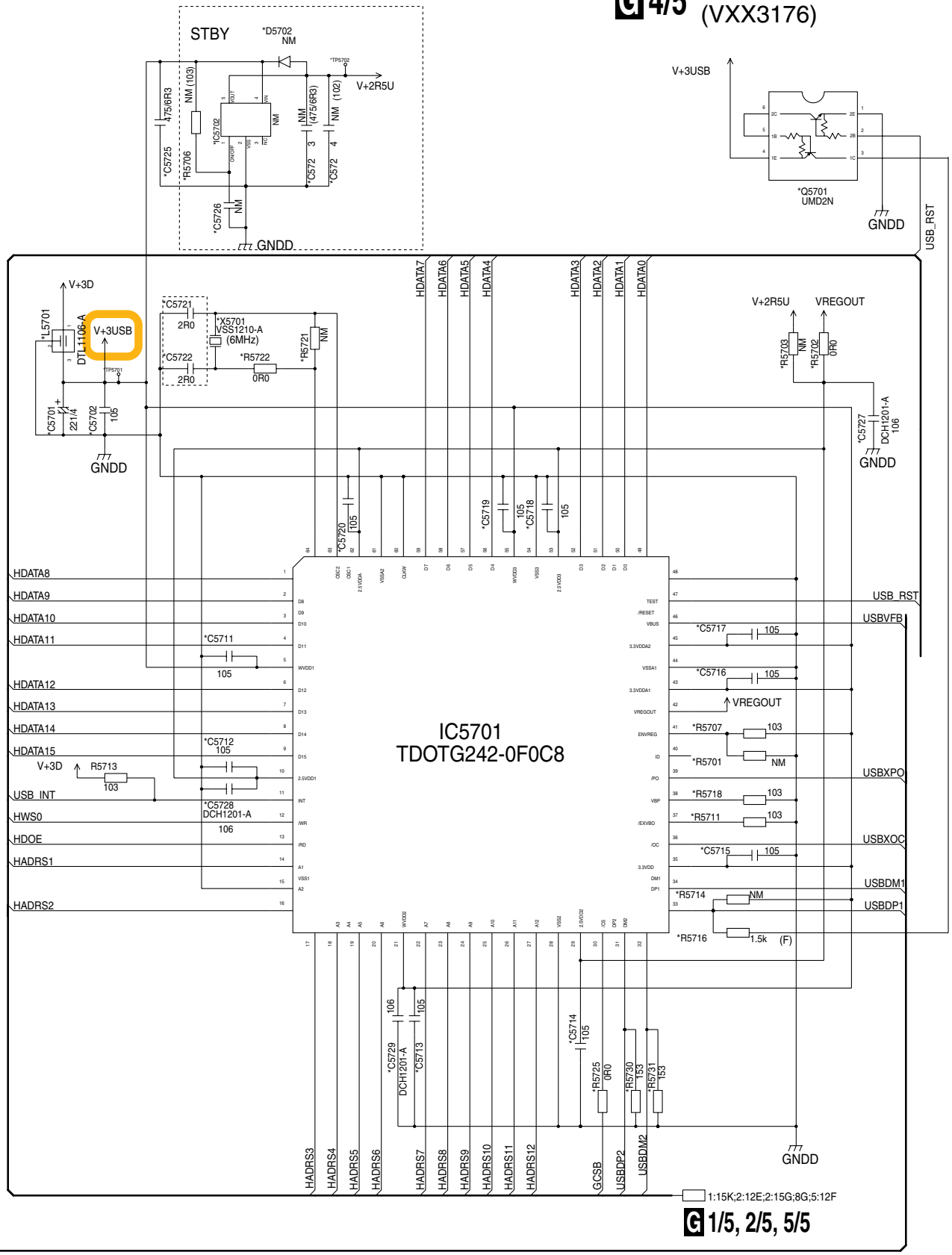

G 3/5 MAIN ASSY (VXX3176)
V+2R5
VTT
SW+3.33V
V+3D
V+3V
V+5A
V+1R5
SW+3.33V
V+1R5_IN
V+1R5
STBY
GNDD
V+5AVI
from EMMA
to EMMA
Y_OUT
C_OUT
YP_OUT
CB_OUT
CR_OUT
CN2301
CN2601
CN4002
CN102
VKN2040-A
IC4531
IC6091
IC6092
IC2201
IC2202
VWV2251
VWV2252
TC7PA53FU
MM1503XN
MM1501XN
2SA1576A(QR)
DV_XADC
DV_YVIN
DV_CIN
J_Y_IN
J_C_IN
Y_IN
C_IN
XRST1
DAT_TOM
HST_TO_M
DAT_TO_M
RFE/XLL_AMCK
SPDIF_HDMI
JTRST
232RST
HSTtoM
SSTtoM
RX0
TX0
RX1_LL
TX1_LL
LLRST
XRESET
RFEXLL
AMCK_LL
SPDIFO
G 2/5
G 5/5
A 1/3
C 1/3
G 3/5
DVR-545HX-S
41

3.14 MAIN ASSY(4/5)



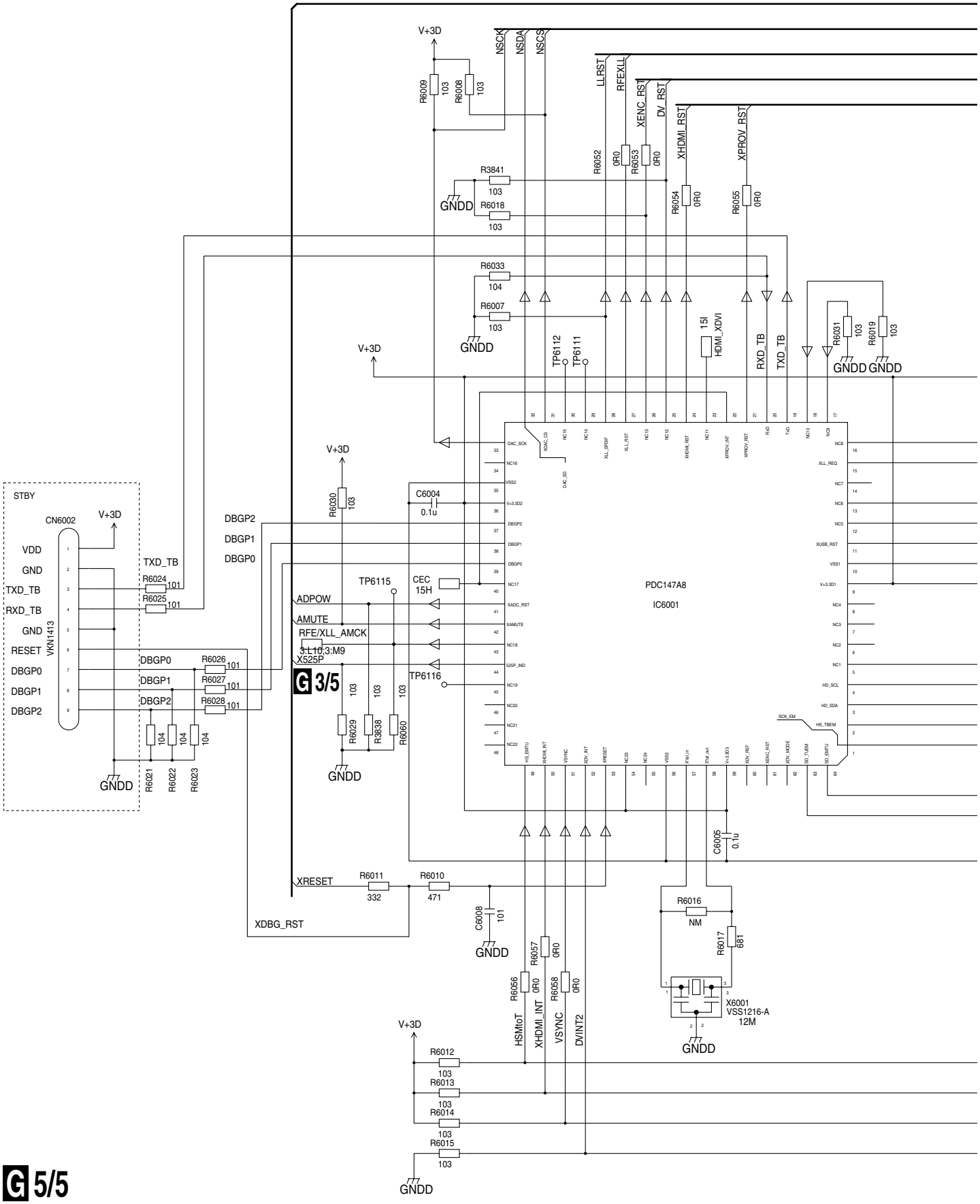
G 4/5

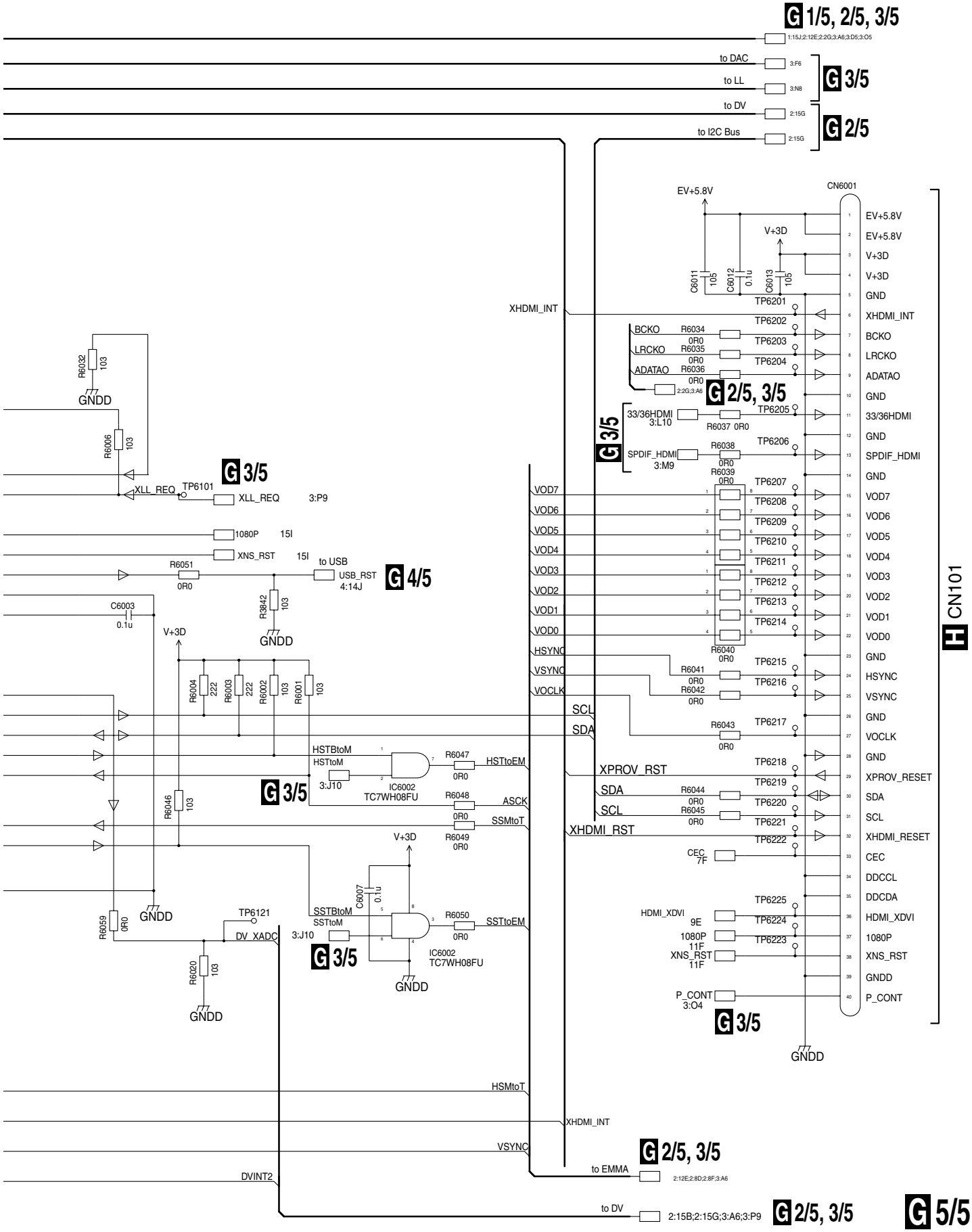
G 4/5 MAIN ASSY (VXX3176)



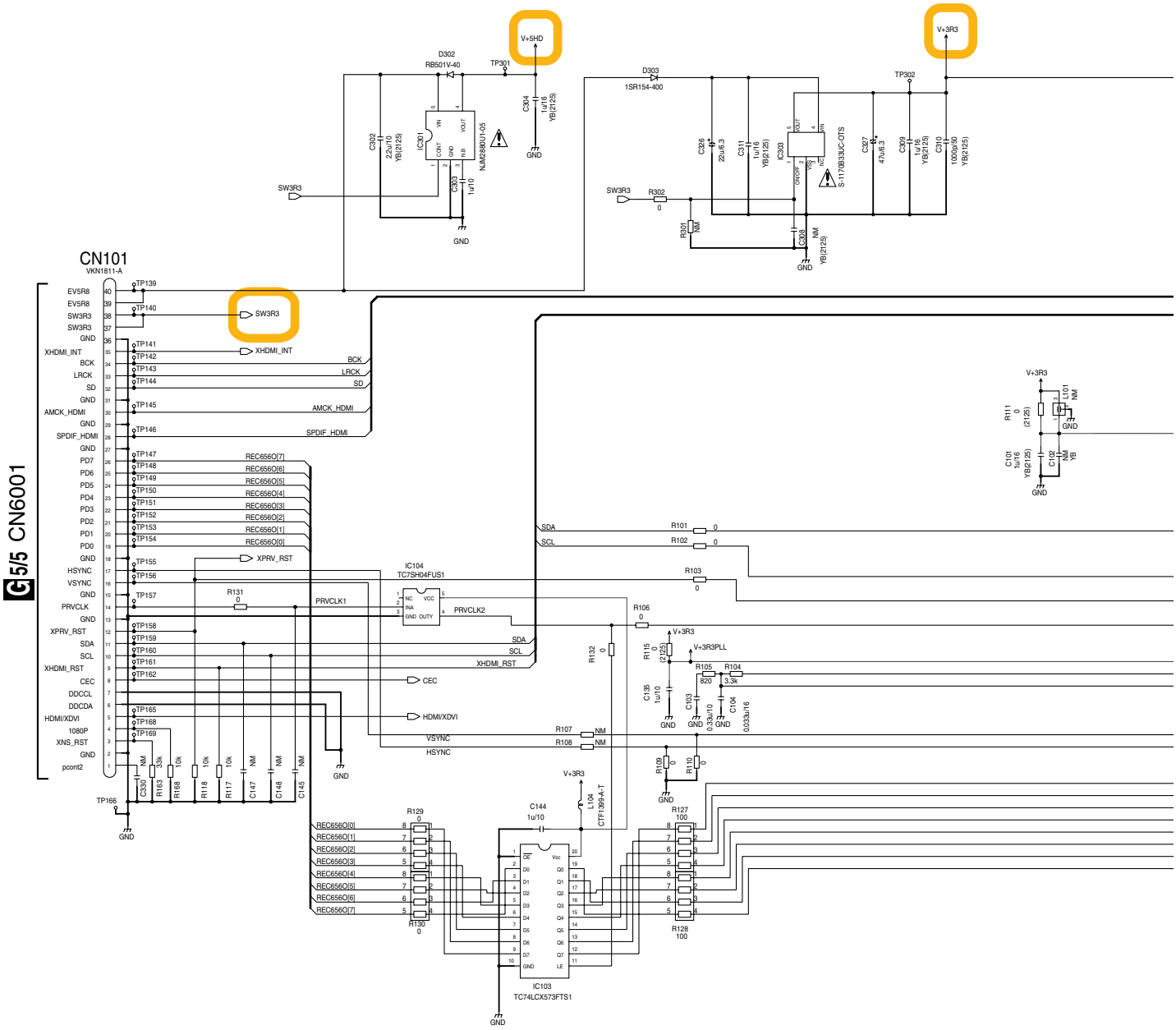
3.15 MAIN ASSY(5/5)

G 5/5 MAIN ASSY (VXX3176)



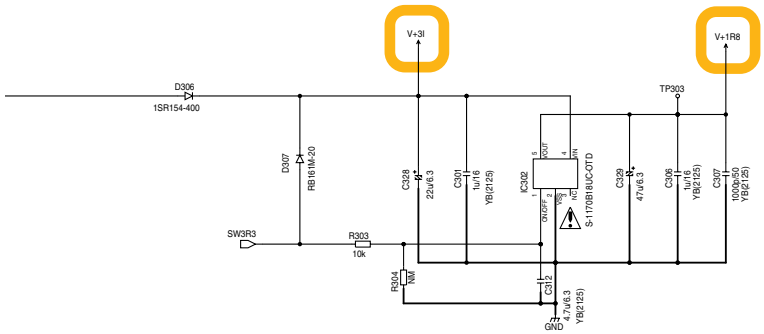

G 1/5, 2/5, 3/5
1:15J;2:12E;2:2G;3:A6;3:D5;3:O5
to DAC
3:F6
to LL
3:N8
G 3/5
to DV
2:15G
to I2C Bus
2:15G
G 2/5
CN6001
EV+5.8V
V+3D
C6011 105
C6012 0.1u
C6013 105
TP6201
XHDMI_INT
TP6202
BCKO
R6034 0R0
TP6203
LRCKO
R6035 0R0
TP6204
ADATAO
R6036 0R0
2:2G;3:A6
G 2/5, 3/5
TP6205
33/36HDMI
3:L10
R6037 0R0
G 3/5
TP6206
SPDIF_HDMI
3:M9
R6038 0R0
R6039 0R0
TP6207
TP6208
TP6209
TP6210
TP6211
TP6212
TP6213
TP6214
R6040 0R0
TP6215
R6041 0R0
TP6216
R6042 0R0
TP6217
R6043 0R0
TP6218
TP6219
R6044 0R0
TP6220
R6045 0R0
TP6221
TP6222
CEC
7F
TP6225
HDMI_XDVI
9E
TP6224
1080P
11F
TP6223
XNS_RST
11F
P_CONT
3:O4
G 3/5
GNDD
H CN101
VOD7
VOD6
VOD5
VOD4
VOD3
VOD2
VOD1
VOD0
HSYNC
VSYNC
VOCLK
SCL
SDA
XPROV_RST
SDA
SCL
XHDMI_RST
R6032 103
GNDD
R6006 103
XLL_REQ
TP6101
XLL_REQ
3:P9
G 3/5
1080P
15I
XNS_RST
15I
to USB
R6051 0R0
USB_RST
4:14J
G 4/5
C6003 0.1u
R3842 103
GNDD
V+3D
R6004 222
R6003 222
R6002 103
R6001 103
HSTBtoM
HSTtoM
3:J10
IC6002
TC7WH08FU
R6047 0R0
HSTtoEM
R6048 0R0
ASCK
R6049 0R0
SSMtoT
G 3/5
R6046 103
GNDD
TP6121
DV_XADC
R6059 0R0
R6020 103
GNDD
V+3D
C6007 0.1u
SSTBtoM
SSTtoM
3:J10
IC6002
TC7WH08FU
R6050 0R0
SSTtoEM
G 3/5
GNDD
HSMtoT
XHDMI_INT
VSYNC
DVINT2
G 2/5, 3/5
to EMMA
2:12E;2:8D;2:8F;3:A6
to DV
2:15B;2:15G;3:A6;3:P9
G 2/5, 3/5
G 5/5

3.16 HDMIB ASSY(1/2)



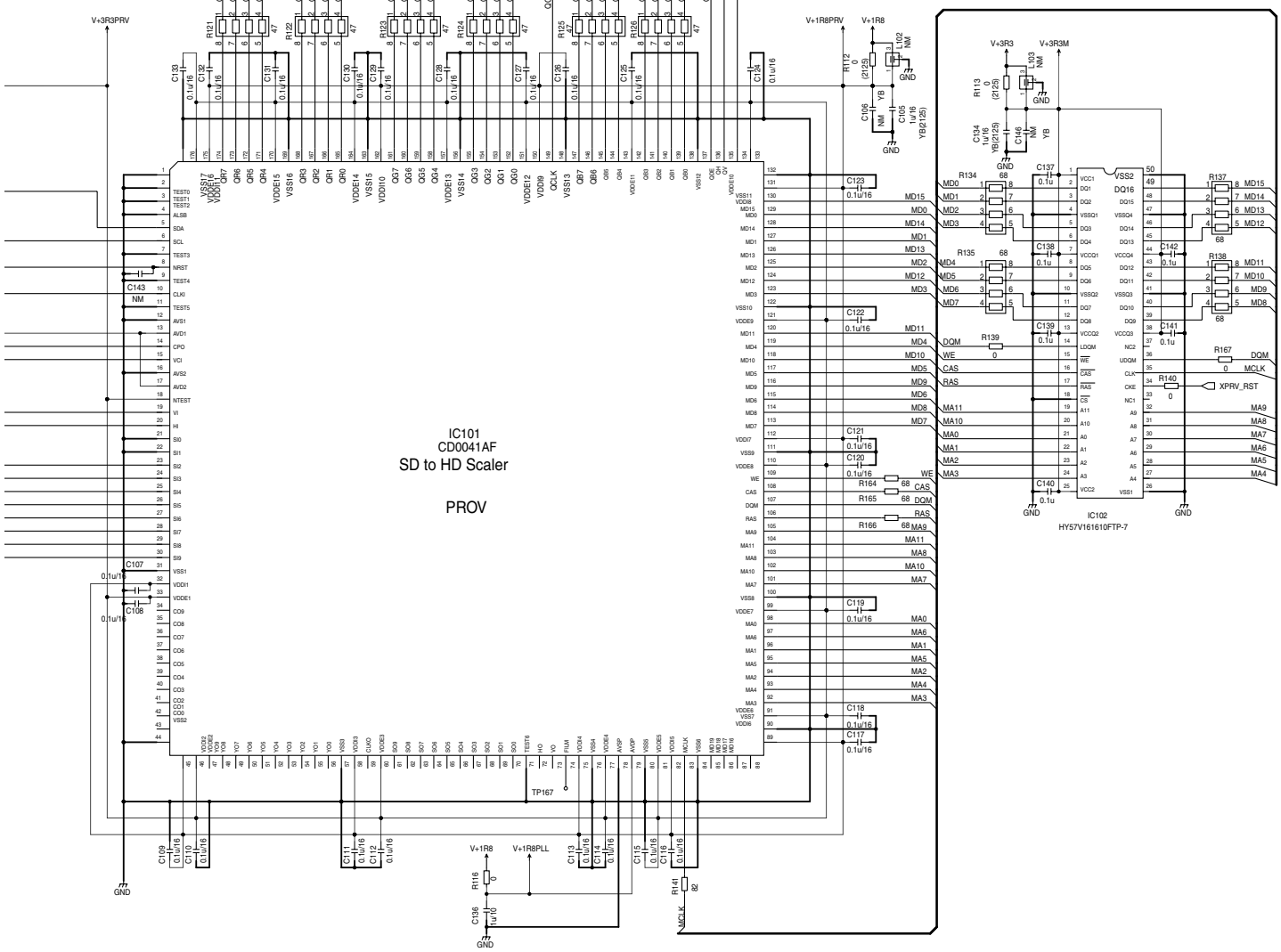
H 1/2

H 1/2 HDMIB ASSY (VWV2247)

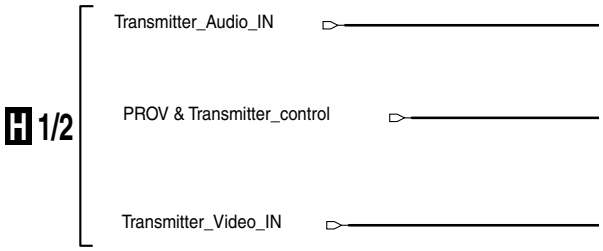


H 2/2

Transmitter Audio_IN
PROV & Transmitter_control
Transmitter_Video_IN

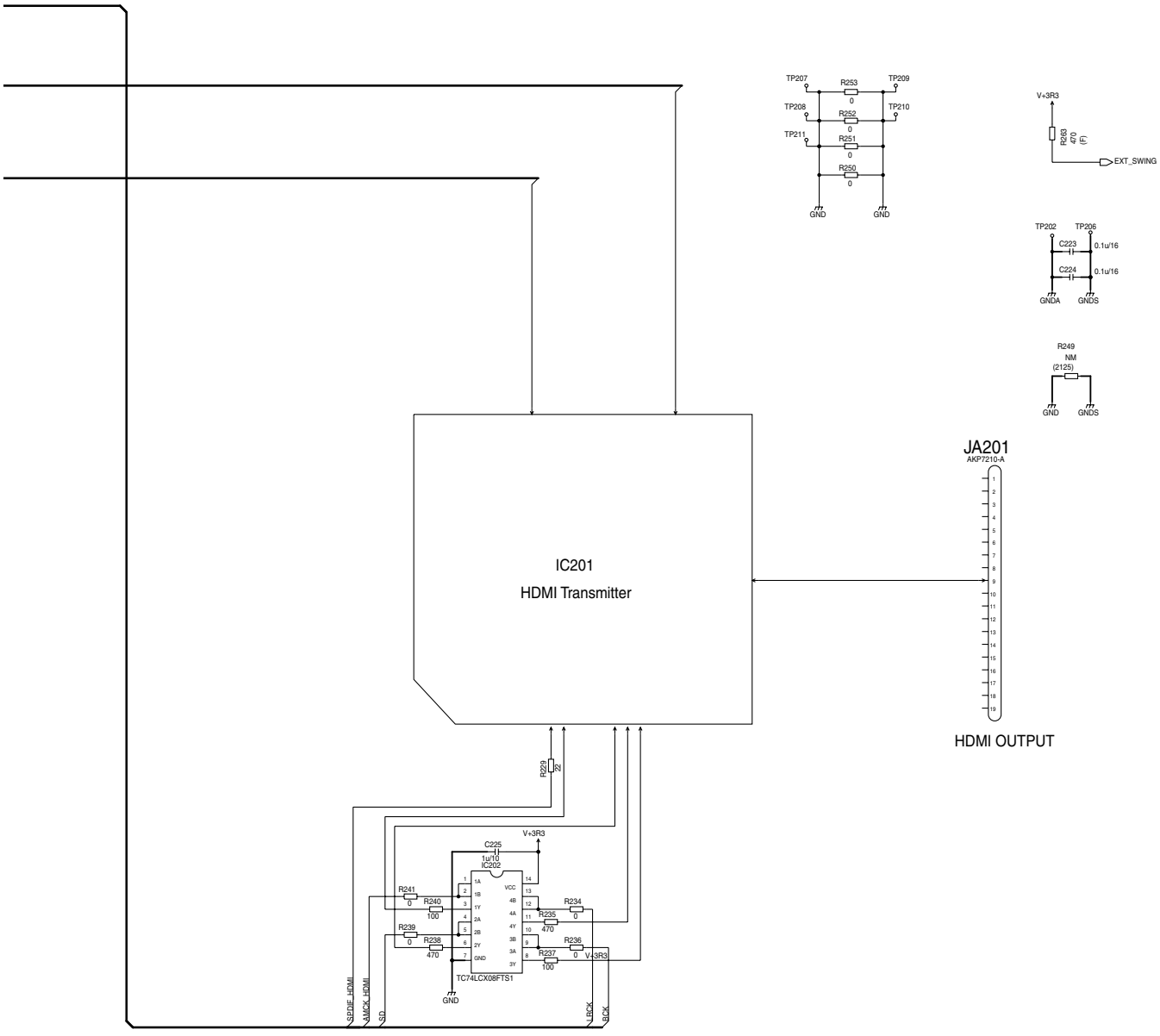


3.17 HDMIB ASSY(2/2)

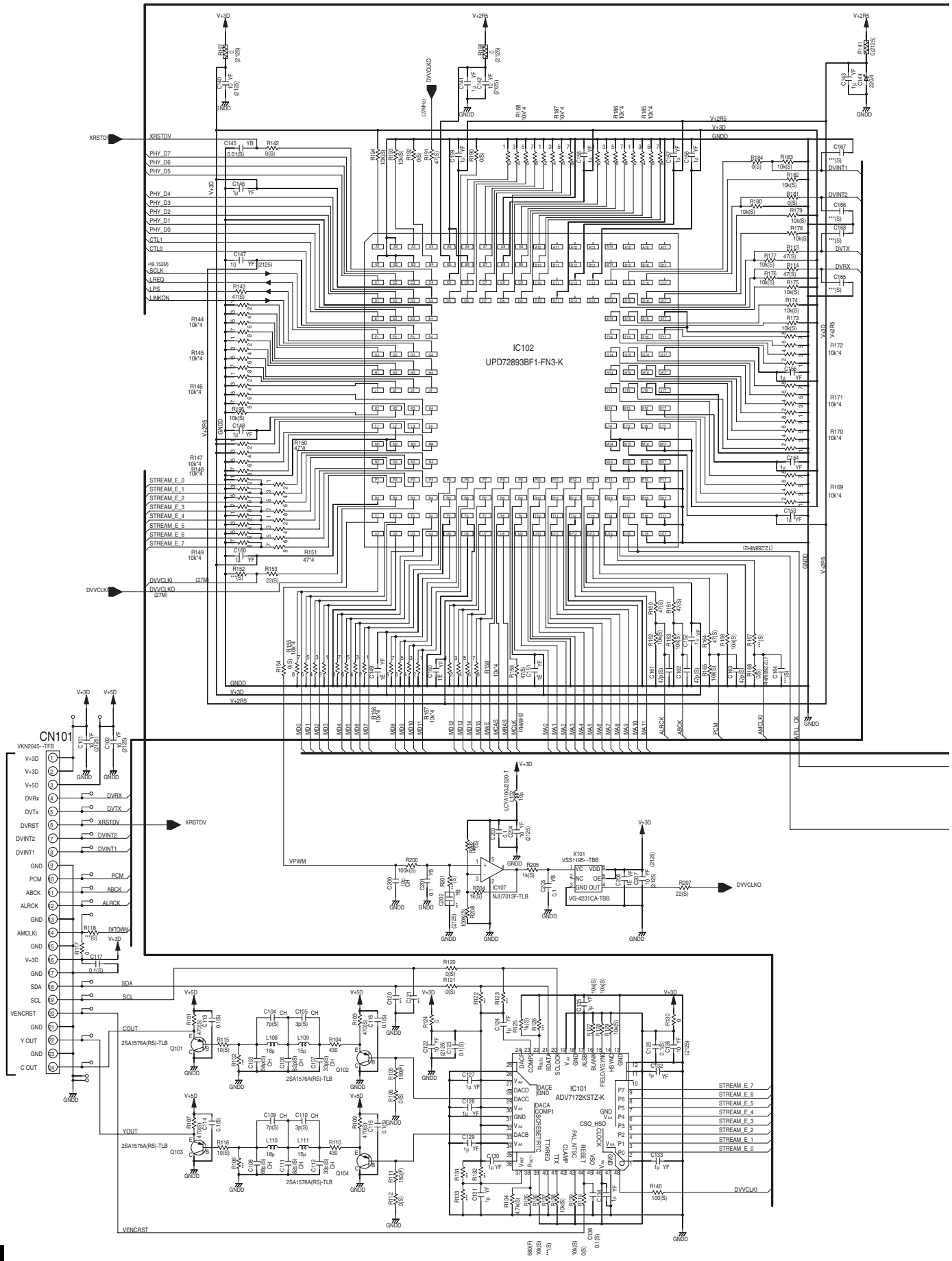


H 2/2

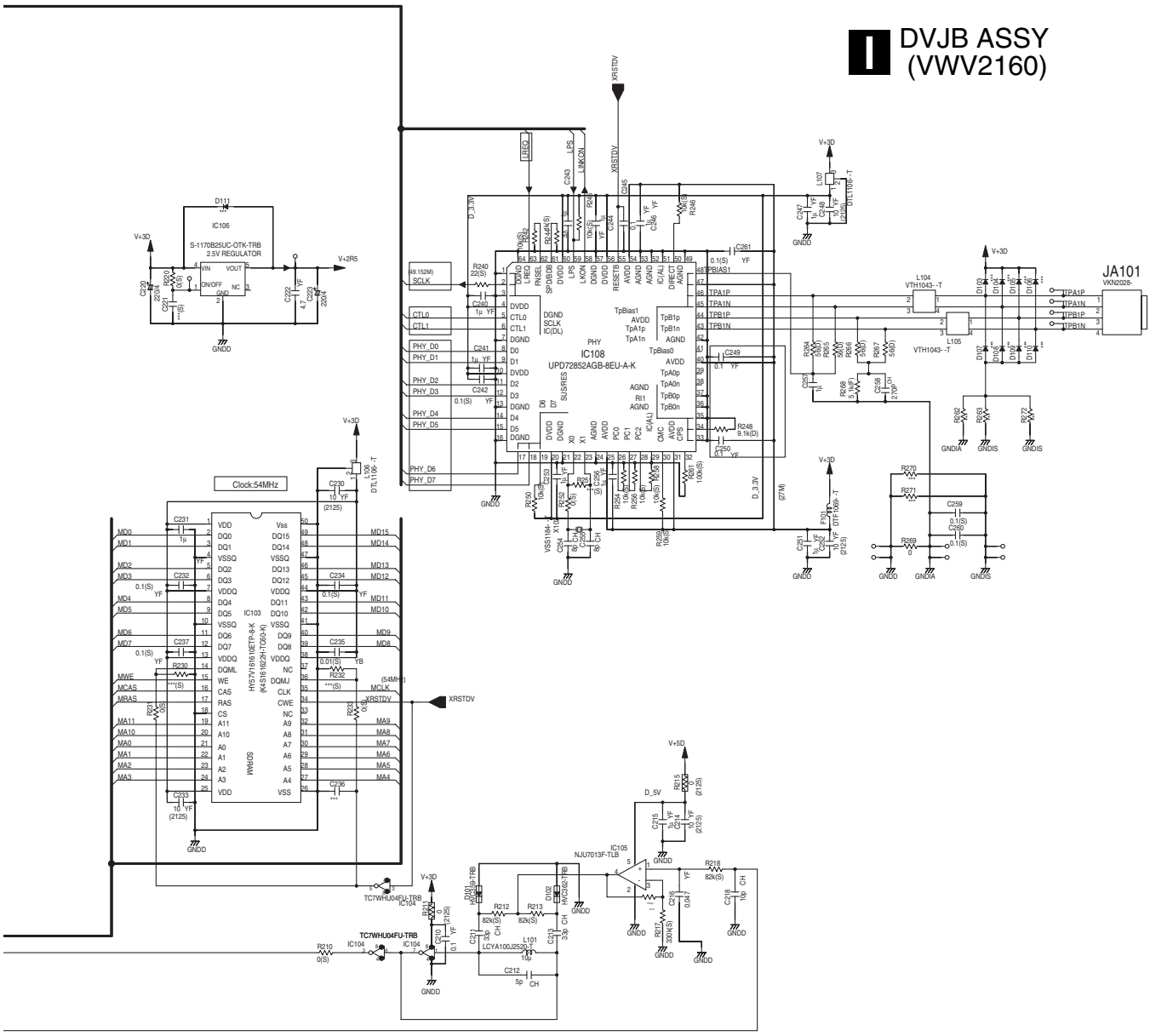
H 2/2 HDMIB ASSY (VWV2247)



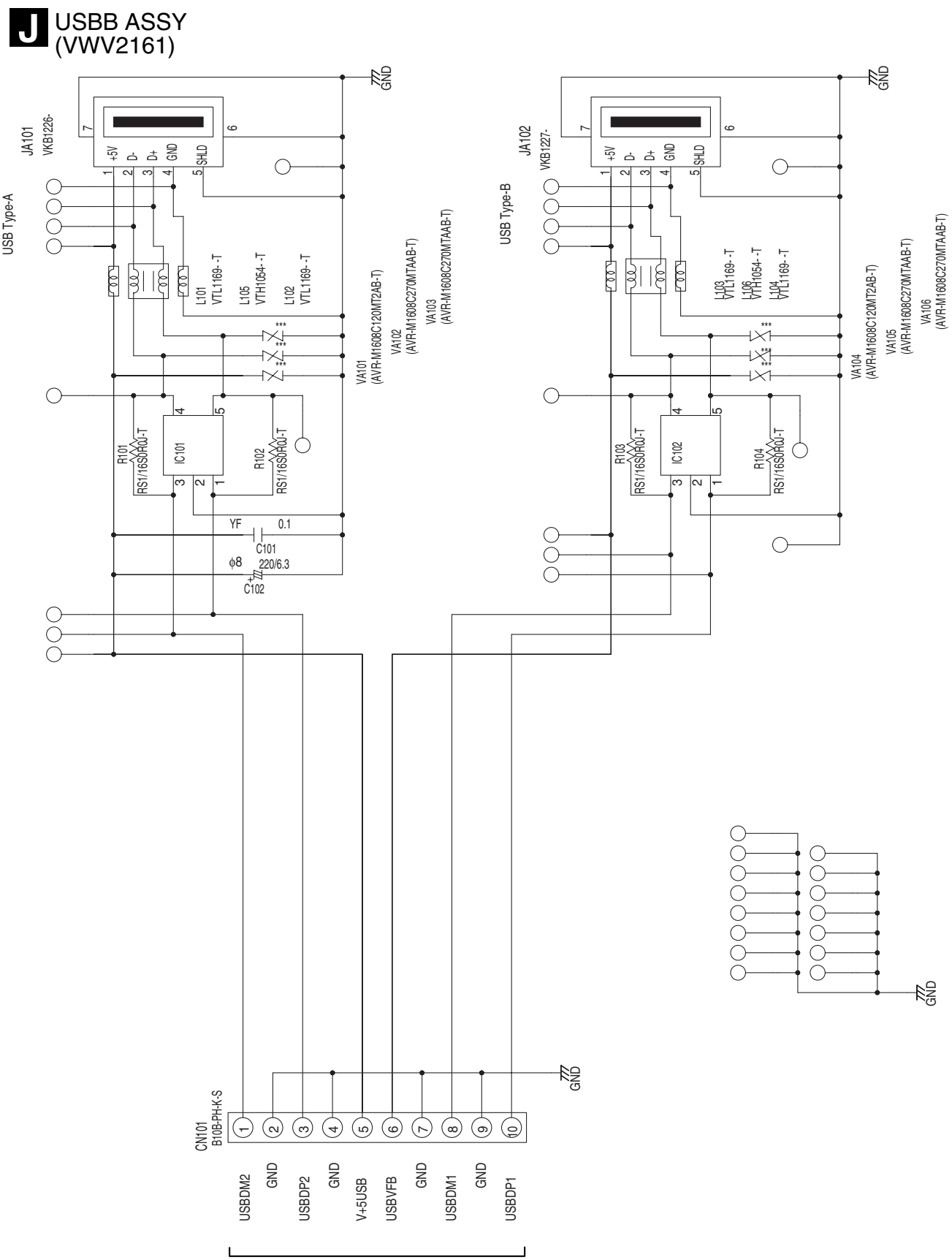
3.18 DVJB ASSY



DVJB ASSY (VWV2160)

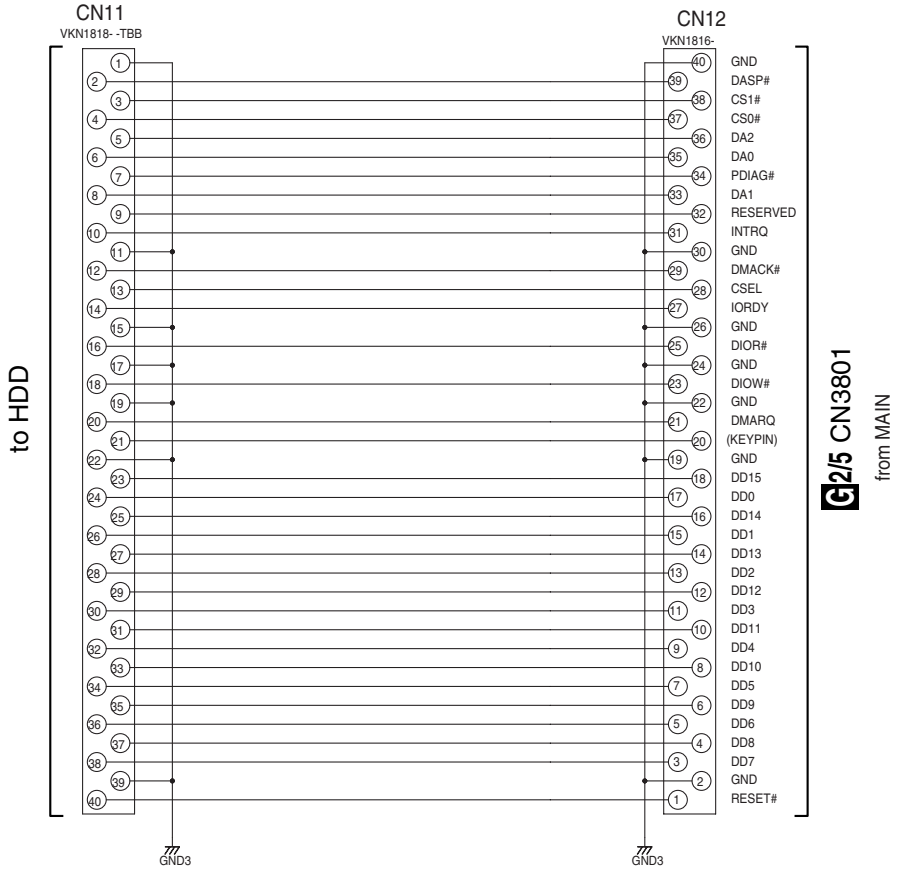


3.19 USBB ASSY



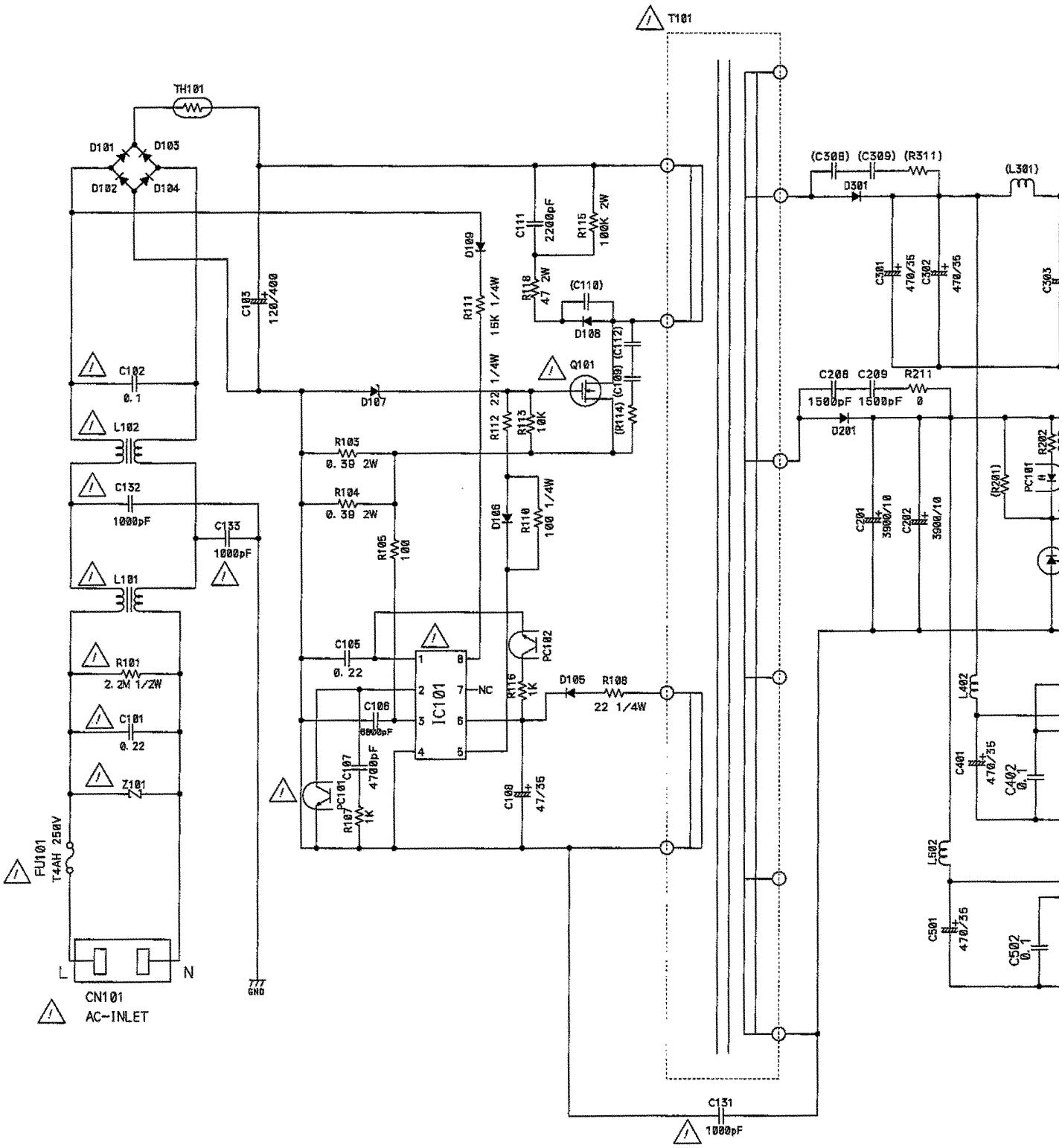
3.20 ATAB ASSY

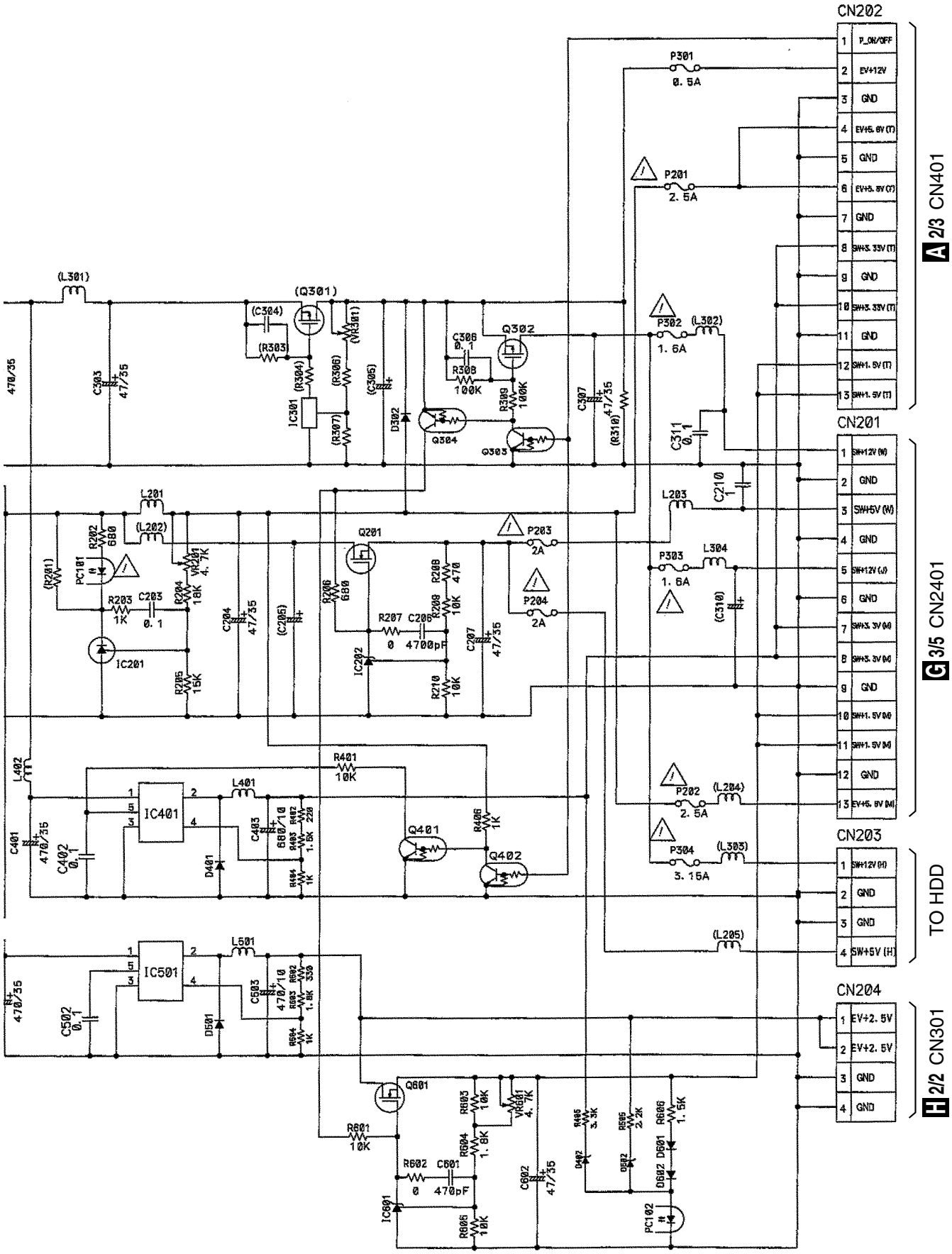
K ATAB ASSY (VWV2276)



3.21 POWER SUPPLY UNIT

L POWER SUPPLY UNIT (VWR1404)



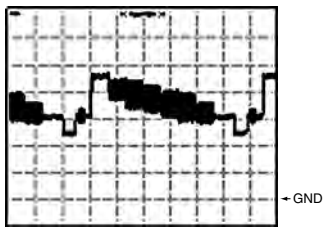

CN202
1 P_ON/OFF
2 EV+12V
3 GND
4 EV+5.0V (T)
5 GND
6 EV+5.0V (T)
7 GND
8 SW+3.3V (T)
9 GND
10 SW+3.3V (T)
11 GND
12 SW+1.5V (T)
13 SW+1.5V (T)
A 2/3 CN401
CN201
1 SW+12V (M)
2 GND
3 SW+5V (M)
4 GND
5 SW+12V (M)
6 GND
7 SW+3.3V (M)
8 SW+3.3V (M)
9 GND
10 SW+1.5V (M)
11 SW+1.5V (M)
12 GND
13 EV+5.0V (M)
G 3/5 CN2401
CN203
1 SW+12V (H)
2 GND
3 GND
4 SW+5V (H)
TO HDD
CN204
1 EV+2.5V
2 EV+2.5V
3 GND
4 GND
H 2/2 CN301
P301 0.5A
P201 2.5A
P302 1.6A
P303 1.6A
P203 2A
P204 2A
P202 2.5A
P304 3.15A
(L301)
(Q301)
(C304)
(R303)
C303 470/35
C305 47/35
(R304)
(R306)
(VR301)
(C305)
IC301
(R307)
D302
Q304
Q303
C306 0.1
Q302
R308 100K
R309 100K
C307 47/35
(R310)
C311 0.1
C210 1
L203
L304
(C310)
L201
(L202)
R202 680
(R201)
PC101
R204 18K
VR201 4.7K
R203 1K
C203 0.1
C204 47/35
(C206)
IC201
R205 15K
Q201
R206 680
R208 470
R207 0
C208 4700pF
R209 10K
IC202
R210 10K
C207 47/35
L402
L401
R401 10K
IC401
C401 470/35
C402 0.1
D401
C403 680/10
R402 220
R403 1.8K
R404 1K
R406 1K
Q401
Q402
L501
IC501
C502 0.1
D501
C503 470/10
R502 330
R503 1.8K
R504 1K
(L204)
(L303)
(L205)
Q601
R601 10K
R603 10K
VR601 4.7K
R604 1.8K
R602 0
C601 470pF
IC601
R605 10K
C602 47/35
R605 3.3K
R606 2.2K
R607 1.5K
D602
D601
PC102

3.22 WAVE FORMS

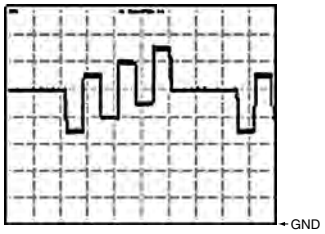
Note : The encircled numbers denote measuring point in the schematic diagram.

A JACB ASSY

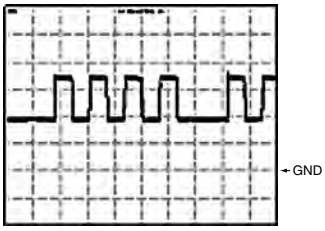
1 IC100-pin18 (TU-VIN)
(Function : Tuner 9ch)
V:500mV/div. H:10μsec/div.



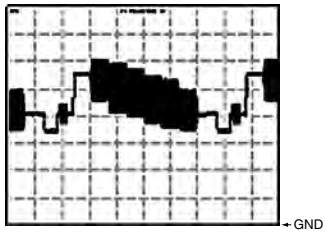
6 C2034+side (CbOUT)
(Function : DVD play)
V:500mV/div. H:10μsec/div.



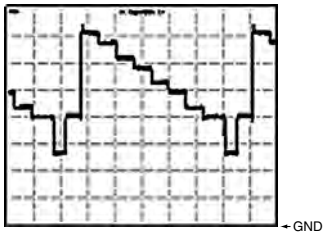
11 CN4002-pin23 (Cb_OUT MtoT)
(Function : DVD play)
V:500mV/div. H:10μsec/div.



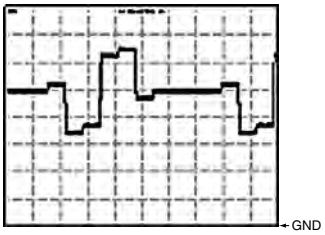
16 IC100-pin14 (2VIN)
(Function : LINE2 IN)
V:500mV/div. H:10μsec/div.



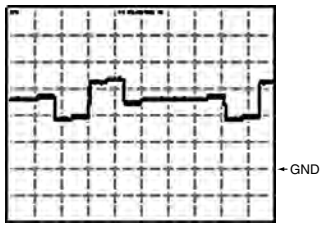
2 C2036+side (Y1OUT)
(Function : DVD play)
V:500mV/div. H:10μsec/div.



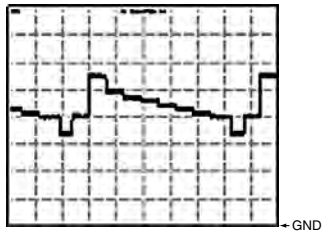
7 C2033+side (CrOUT)
(Function : DVD play)
V:500mV/div. H:10μsec/div.



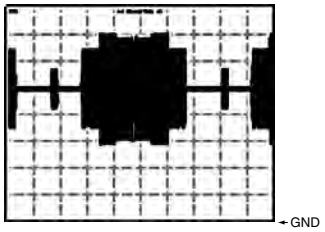
12 CN4002-pin25 (Cr_OUT MtoT)
(Function : DVD play)
V:500mV/div. H:10μsec/div.



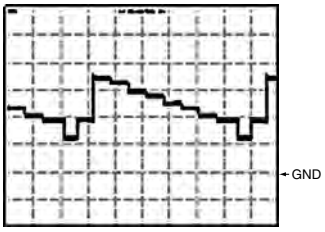
17 IC100-pin7 (Y2IN)
(Function : LINE2 IN)
V:500mV/div. H:10μsec/div.



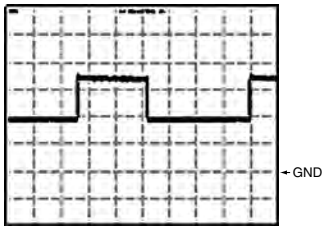
3 IC100-pin34 (C1OUT)
(Function : DVD play)
V:500mV/div. H:10μsec/div.



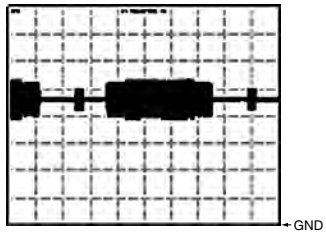
8 CN4002-pin19 (Y_OUT MtoT)
(Function : Tuner 9ch)
V:500mV/div. H:10μsec/div.



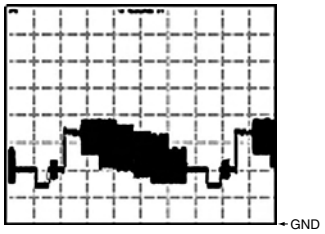
13 CN4002-pin21 (Y/G_OUT MtoT)
(Function : DVD play)
V:500mV/div. H:10μsec/div.



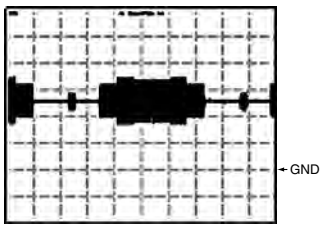
18 IC100-pin9 (C2IN)
(Function : LINE2 IN)
V:500mV/div. H:10μsec/div.



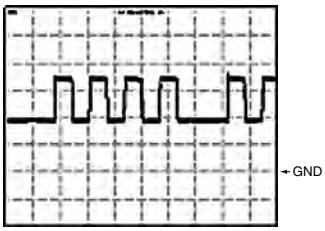
4 C2037+side (V1OUT)
(Function : DVD play)
V:1V/div. H:10μsec/div.



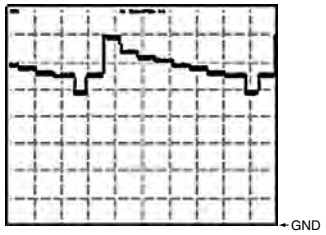
9 CN4002-pin17 (C_OUT MtoT)
(Function : DVD play)
V:500mV/div. H:10μsec/div.



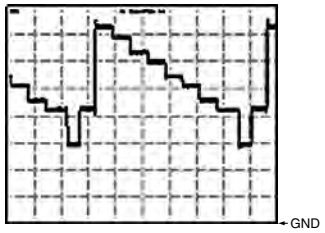
14 CN4002-pin23 (Cb/B_OUT MtoT)
(Function : DVD play)
V:500mV/div. H:10μsec/div.



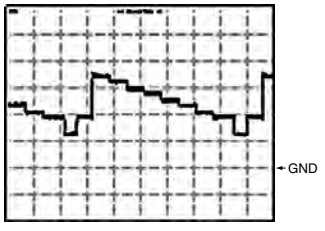
19 CN4002-pin28 (Y_IN TtoM)
(Function : LINE2 IN)
V:500mV/div. H:10μsec/div.



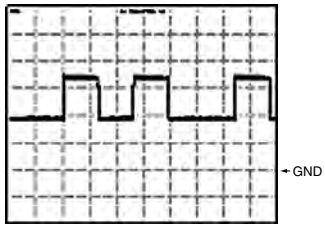
5 C2035+side (YOUT)
(Function : DVD play)
V:500mV/div. H:10μsec/div.



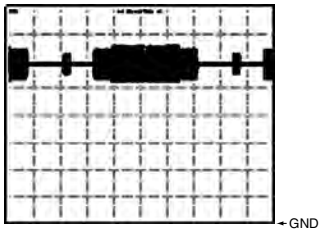
10 CN4002-pin21 (Yp_OUT MtoT)
(Function : DVD play)
V:500mV/div. H:10μsec/div.



15 CN4002-pin25 (Cr/R_OUT MtoT)
(Function : DVD play)
V:500mV/div. H:10μsec/div.



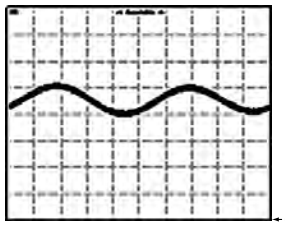
20 CN4002-pin30 (C_IN TtoM)
(Function : LINE2 IN)
V:500mV/div. H:10μsec/div.



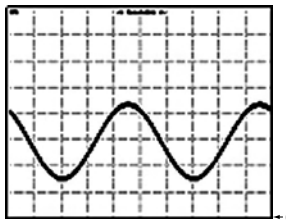
A JACB ASSY

Measurement Condition :

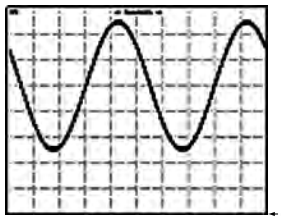
21 **IC100-pin87 (TU-LIN)**
(Function : Tuner 9ch)
V:500mV/div. H:10μsec/div.



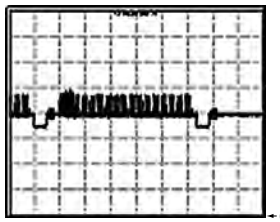
22 **C2038+side (L_OUT)**
Function : DVD play)
V:500mV/div. H:10μsec/div.



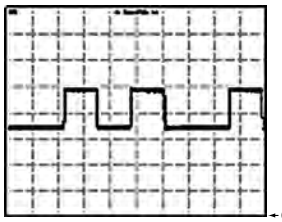
23 **CN4002-pin32 (L_IN)**
(Function : LINE2 IN)
V:500mV/div. H:10μsec/div.



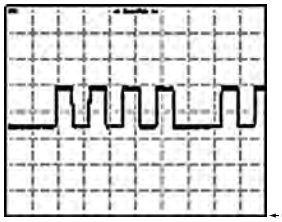
24 **IC101-pin81 (TEXTV)**
(Function : RF IN)
V:1V/div. H:10μsec/div.



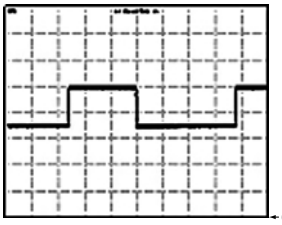
25 **JA801-pin15 (R/C IN)**
(Function : LINE1 IN)
V:500mV/div. H:10μsec/div.



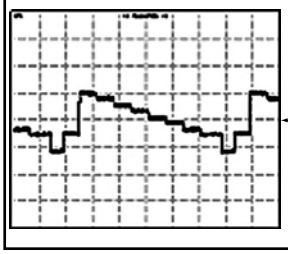
26 **JA801-pin7 (BIN)**
(Function : LINE1 IN)
V:500mV/div. H:10μsec/div.



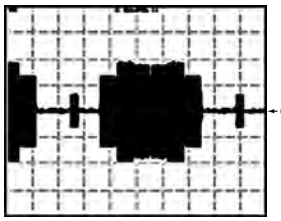
27 **JA801-pin11 (G IN)**
(Function : LINE1 IN)
V:500mV/div. H:10μsec/div.



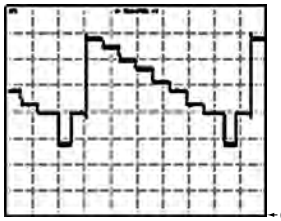
28 **JA801-pin20 (AV2_V/Y IN))**
(Function : LINE1 IN)
V:1V/div. H:10μsec/div.



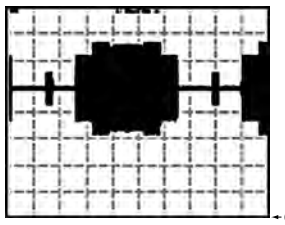
29 **JA801-pin15 (R/C IN)**
(Function : LINE1 IN)
V:500mV/div. H:10μsec/div.



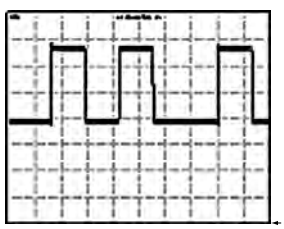
30 **CN1-pin29 (AV1_V/Y_OUT)**
(Function : DVD play)
V:500mV/div. H:10μsec/div.



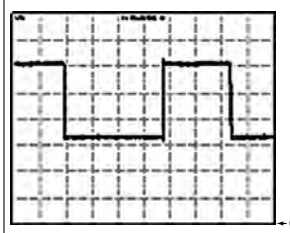
31 **CN1-pin26 (AV1_R/C_OUT)**
(Function : DVD play)
V:500mV/div. H:10μsec/div.



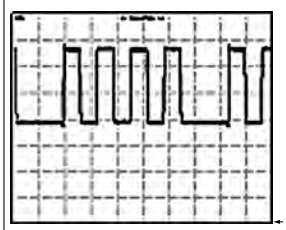
32 **CN1-pin26 (AV1_R/C_OUT)**
(Function : DVD play)
V:1V/div. H:10μsec/div.



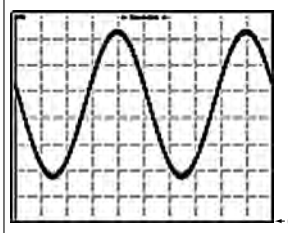
33 **CN1-pin24 (AV1_G_OUT)**
(Function : DVD play)
V:500mV/div. H:10μsec/div.



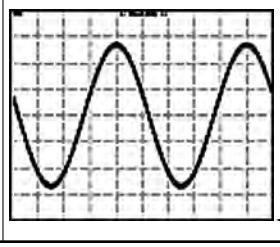
34 **CN1-pin12 (AV1_B_OUT)**
(Function : DVD play)
V:500mV/div. H:10μsec/div.



35 **CN1-pin4 (AV1_L_OUT)**
(Function : DVD play)
V:500mV/div. H:10μsec/div.



36 **JA801-pin6 (AV2_L_IN)**
(Function : LINE1 IN)
V:1V/div. H:10μsec/div.



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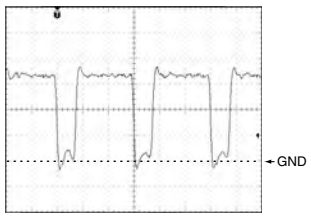
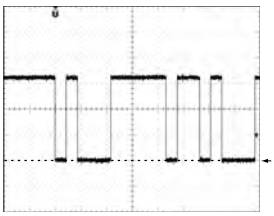
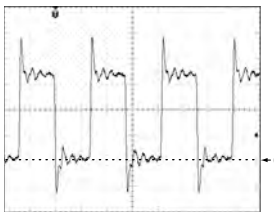
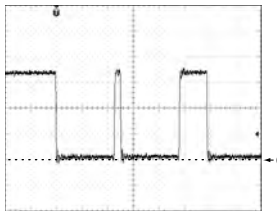
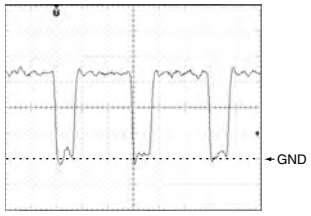
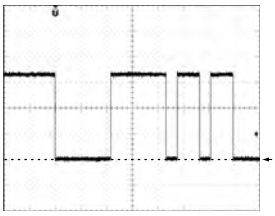
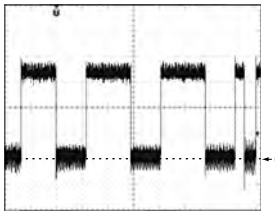
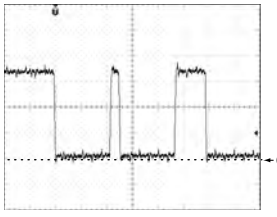
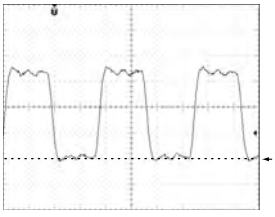
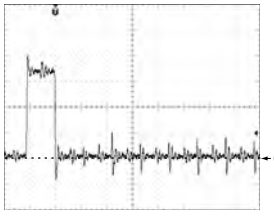
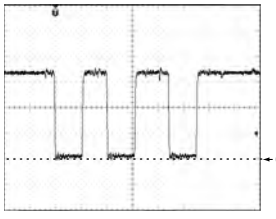
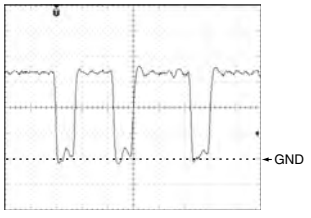
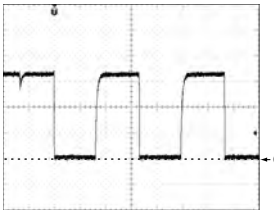
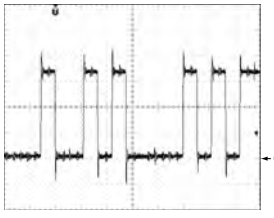
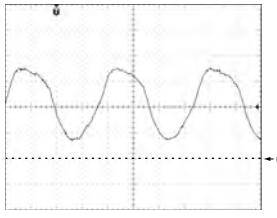
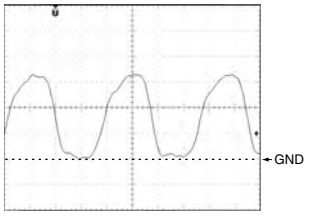
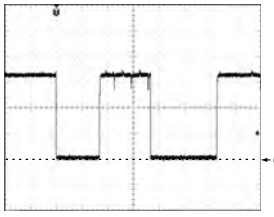
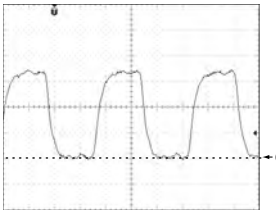
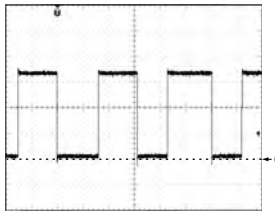
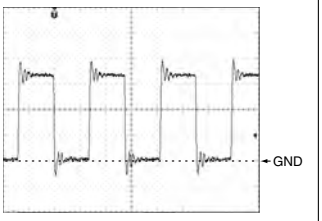
Measurement Condition :

1 IC101-pin16 (DNEB) H: 10ns/div V: 1v/div 	**6** IC106 Pin 146 (TXD1B) H: 20ns/div V: 1v/div 	**11** IC106 Pin 1 (CT TPS8) H: 40ns/div V: 1v/div 	**16** IC205 Pin 25 (EC7A) H: 100ns/div V: 1v/div 
2 IC101 Pin 17 (DCASB) H: 10ns/div V: 1v/div 	**7** IC106 Pin 145 (RXD1B) H: 20ns/div V: 1v/div 	**12** IC106 Pin 2 (CT TPS9) H: 4ms/div V: 1v/div 	**17** IC205 Pin 27 (EC8A) H: 100ns/div V: 1v/div 
3 IC101 Pin 18 (DRASB) H: 10ns/div V: 1v/div 	**8** IC106 Pin 137 (CLK27IN) H: 10ns/div V: 1v/div 	**13** IC106 Pin 4 (CT TPS10) H: 100ns/div V: 1v/div 	**18** IC205 Pin 11 (EC6A) H: 100ns/div V: 1v/div 
4 IC101 Pin 19 (DCSB) H: 10ns/div V: 1v/div 	**9** IC106 Pin 118 (SCL0) H: 4ms/div V: 1v/div 	**14** IC106 Pin 5 (CT TPS0) H: 200ns/div V: 1v/div 	**19** IC313 Pin 63 (X300) H: 10ns/div V: 500mv/div 
5 IC101 Pin 38 (SDCLK) H: 2ns/div V: 1v/div 	**10** IC106 Pin 117 (SDA0) H: 20ms/div V: 1v/div 	**15** IC201 Pin 36 (CI_27MMHz) H: 10ns/div V: 1v/div 	**20** IIC313 Pin 38 (TSVALID) H: 4ms/div V: 1v/div 

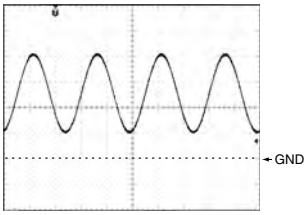
C DTBR ASSY

Measurement Condition :

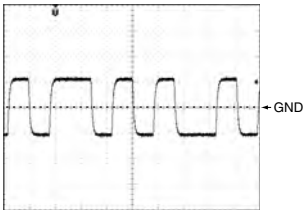
21 **IC313 Pin 36 (TSCLK)**
H: 40ns/div V: 1v/div



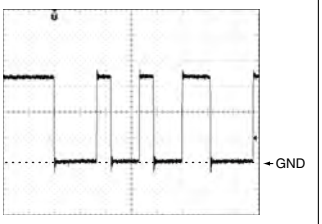
26 **CN103 Pin6 (DT_L)**
H: 400ms/div V: 2v/div



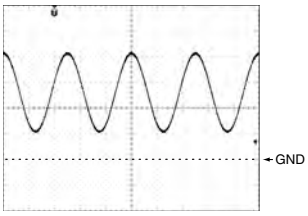
31 **JA101 TP112 (SPDIF)**
H: 200ns/div V: 500mv/div



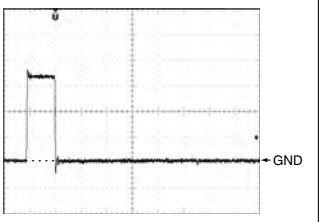
22 **IC313 Pin 34 (TSDAT0)**
V:000mV/div. H:00µsec/div.



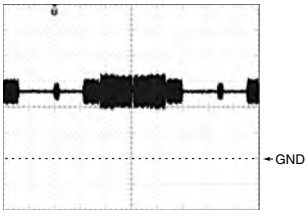
27 **CN103 Pin8 (DT_R)**
H: 400ms/div V: 2v/div



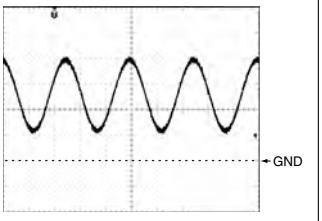
23 **IC313 Pin 23 (TSFSTART)**
H: 100ns/div V: 1v/div



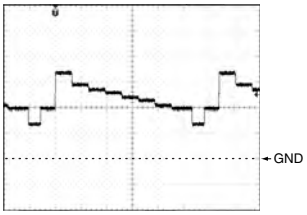
28 **CN103 Pin 10 (DT_C)**
H: 10ms/div V: 500mv/div



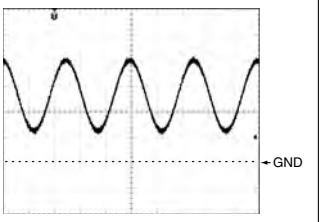
24 **IC501 Pin 8 (VoutR)**
H: 400ms/div V: 1v/div



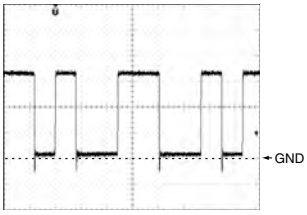
29 **CN103 Pin 12 (DT_Y)**
H: 10ms/div V: 500mv/div



25 **IC501 Pin 7 (VoutL)**
H: 400ms/div V: 1v/div



30 **IC109 Pin 13 (SPDIFRFE)**
H: 200ns/div V: 1v/div

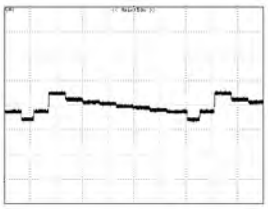


G MAIN ASSY

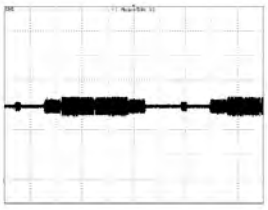
Measurement Condition :

No.1 - 8 : EBU Color Bar (100 / 0 / 75 / 0)

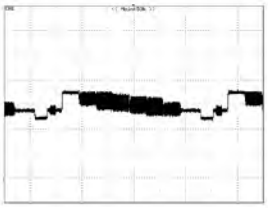
1 CN2301 Pin8 (Y_IN)
V: 1V/div. H: 10us/div.



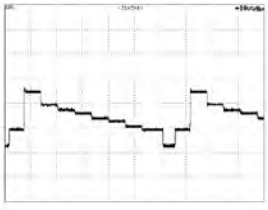
2 CN2301 Pin6 (C_IN)
V: 1V/div. H: 10us/div.



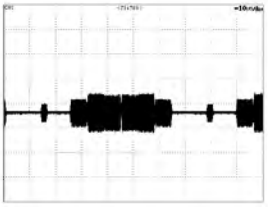
3 CN2301 Pin_8 (CVBS_IN)
V: 1V/div. H: 10us/div.



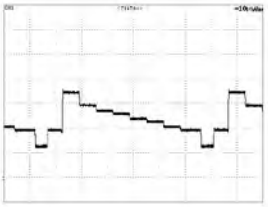
4 CN2301 Pin17 (Y_OUT)
V: 0.5V/div. H: 10us/div.



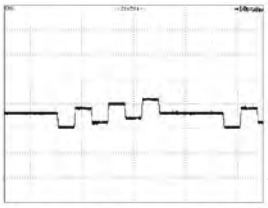
5 CN2301 Pin19 (C_OUT)
V: 0.5V/div. H: 10us/div.



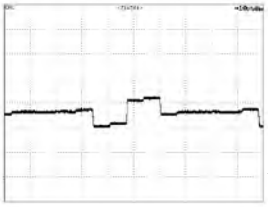
6 CN2301 Pin15 (YP_OUT)
V: 0.5V/div. H: 10us/div.



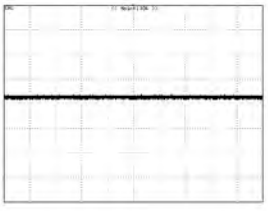
7 CN2301 Pin13 (CB_OUT)
V: 0.5V/div. H: 10us/div.



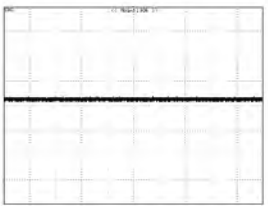
8 CN2301 Pin11 (CR_OUT)
V: 0.5V/div. H: 10us/div.



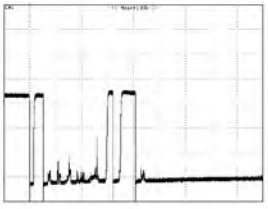
9 IC501 Pin22 (XDMUTE1)
V: 1V/div. H: 20us/div.



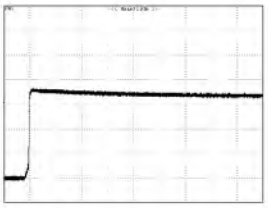
10 IC501 Pin23 (XDMUTE2)
V: 1V/div. H: 20us/div.



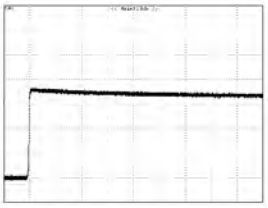
11 CN601 Pin3 (CLOSE)
open → close
V: 1V/div. H: 20us/div.



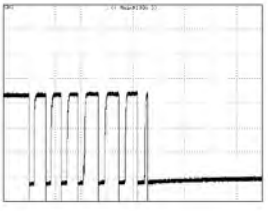
12 CN601 Pin3 (CLOSE)
close → open
V: 1V/div. H: 20us/div.



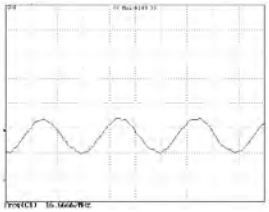
13 CN601 Pin5 (CLOSE)
open → close
V: 1V/div. H: 20us/div.



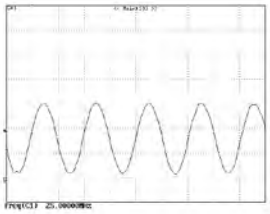
14 CN601 Pin5 (CLOSE)
close → open
V: 1V/div. H: 20us/div.



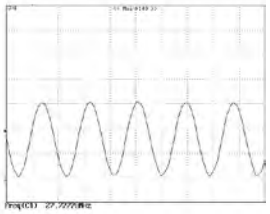
15 X201 (16.93MHz)
V: 1V/div. H: 20ns/div.



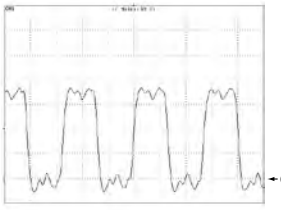
16 X1001 (24.576MHz)
V: 1V/div. H: 20ns/div.



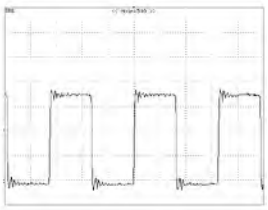
17 X1002 (27MHz)
V: 1V/div. H: 20ns/div.



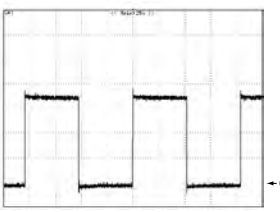
18 IC3101 Pin11 (ADCCLKO)
V: 1V/div. H: 20ns/div.



19 IC3101 Pin12 (AD_BCK)
V: 1V/div. H: 100ns/div.

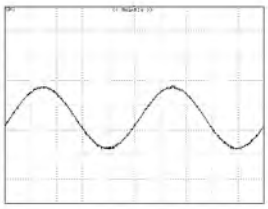


20 IC3101 Pin10 (AD_LRCK)
V: 1V/div. H: 5us/div.

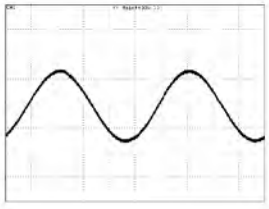


G MAIN ASSY

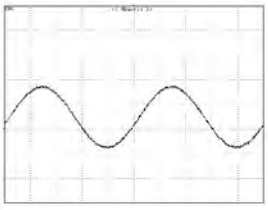
21 **CN2301 Pin4 (LCH IN)**
V: 1V/div. H: 200us/div.



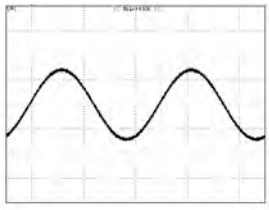
26 **CN2301 Pin21 (LCH OUT)**
V: 2V/div. H: 200us/div.



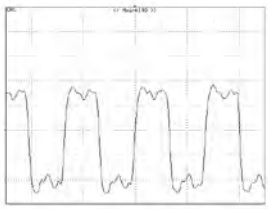
22 **CN2301 Pin2 (RCH IN)**
V: 1V/div. H: 200us/div.



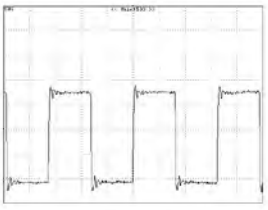
27 **CN2301 Pin23 (RCH OUT)**
V: 2V/div. H: 200us/div.



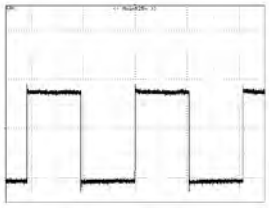
23 **IC3201 Pin16 (DACCLKO)**
V: 1V/div. H: 20ns/div.



24 **IC3201 Pin1 (DACBCKO)**
V: 1V/div. H: 100ns/div.



25 **IC3201 Pin3 (DACLRCKO)**
V: 0.5V/div. H: 5us/div.



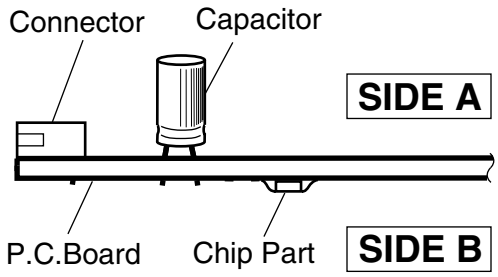
4. PCB CONNECTION DIAGRAM

NOTE FOR PCB DIAGRAMS :

1. Part numbers in PCB diagrams match those in the schematic diagrams.
2. A comparison between the main parts of PCB and schematic diagrams is shown below.

Symbol In PCB Diagrams	Symbol In Schematic Diagrams	Part Name
B C E	B C E B C E	Transistor
B C E	B C E B C E	Transistor with resistor
D G S	D G S D G S	Field effect transistor
		Resistor array
		3-terminal regulator

3. The parts mounted on this PCB include all necessary parts for several destinations.
   For further information for respective destinations, be sure to check with the schematic diagram.
4. View point of PCB diagrams.

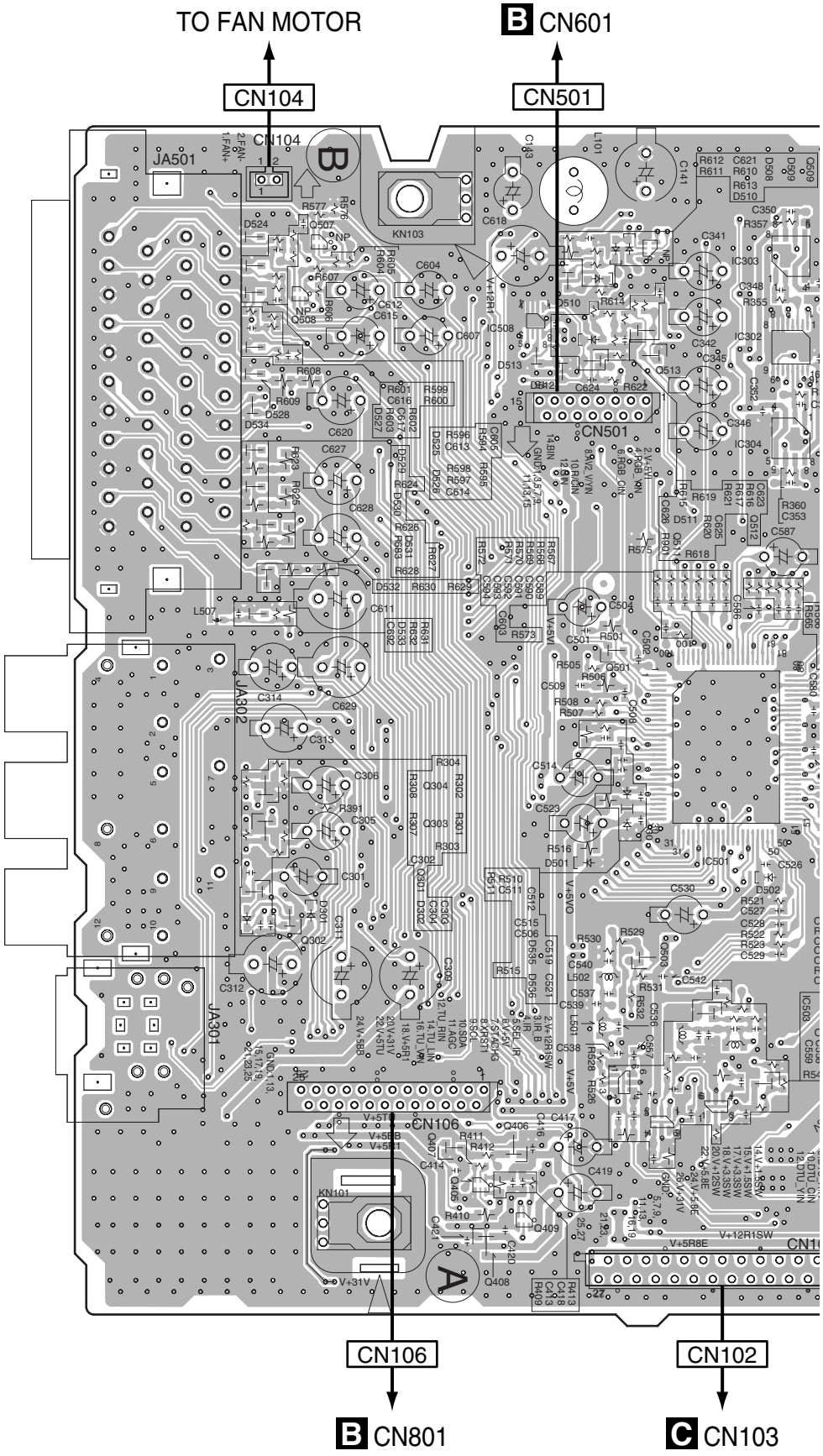


4.1 JACB ASSY

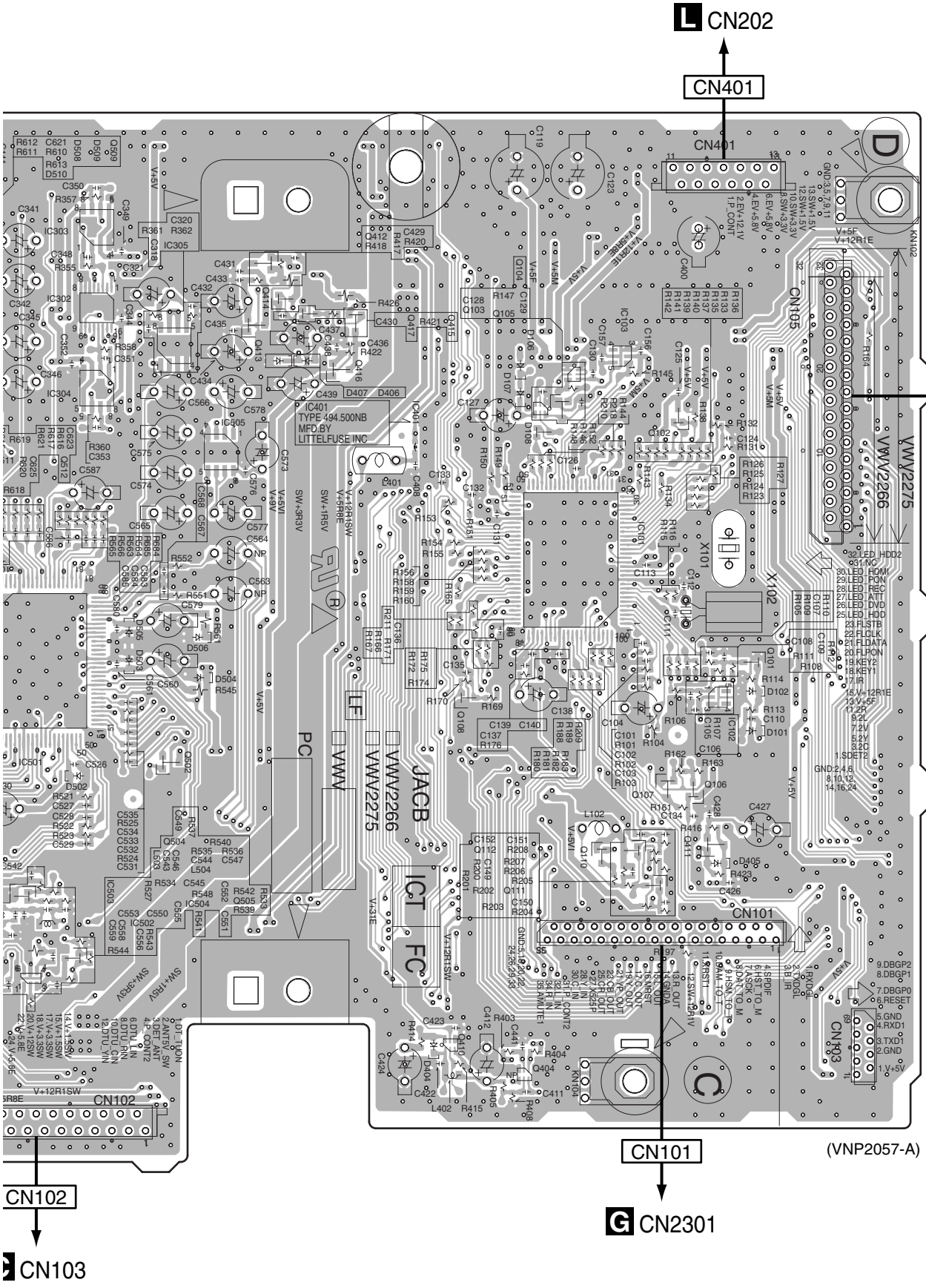
SIDE A

A JACB ASSY

IC	Q
	Q509
	Q507
IC303	Q412
IC305	
	Q104
	Q510
IC508	Q508 Q414
IC302 IC103	
	Q417 Q415 Q103 Q105
	Q513
	Q413
	Q416
IC304 IC401	
IC505	
	Q102
	Q512
	Q511
IC101	
	Q501
	Q101
	Q304
	Q108
IC102	
	Q303
	Q502
IC501	
	Q301
	Q106
	Q107
	Q503
	Q302 Q504 Q110 Q411
	Q112
IC503	
	Q111
IC504	Q505
IC502	
	Q407 Q406
	Q410
	Q405
	Q404
	Q409
	Q408

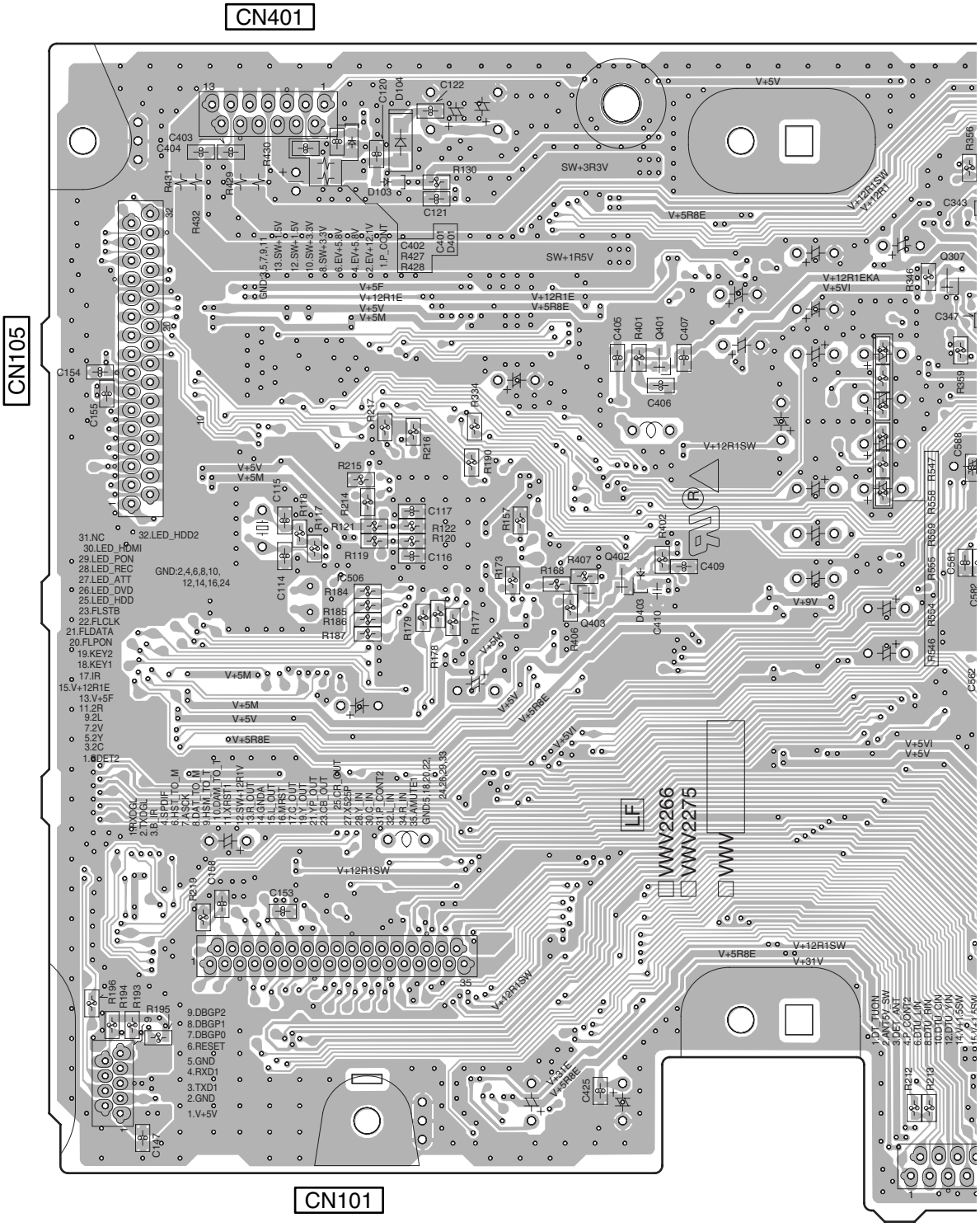


SIDE A

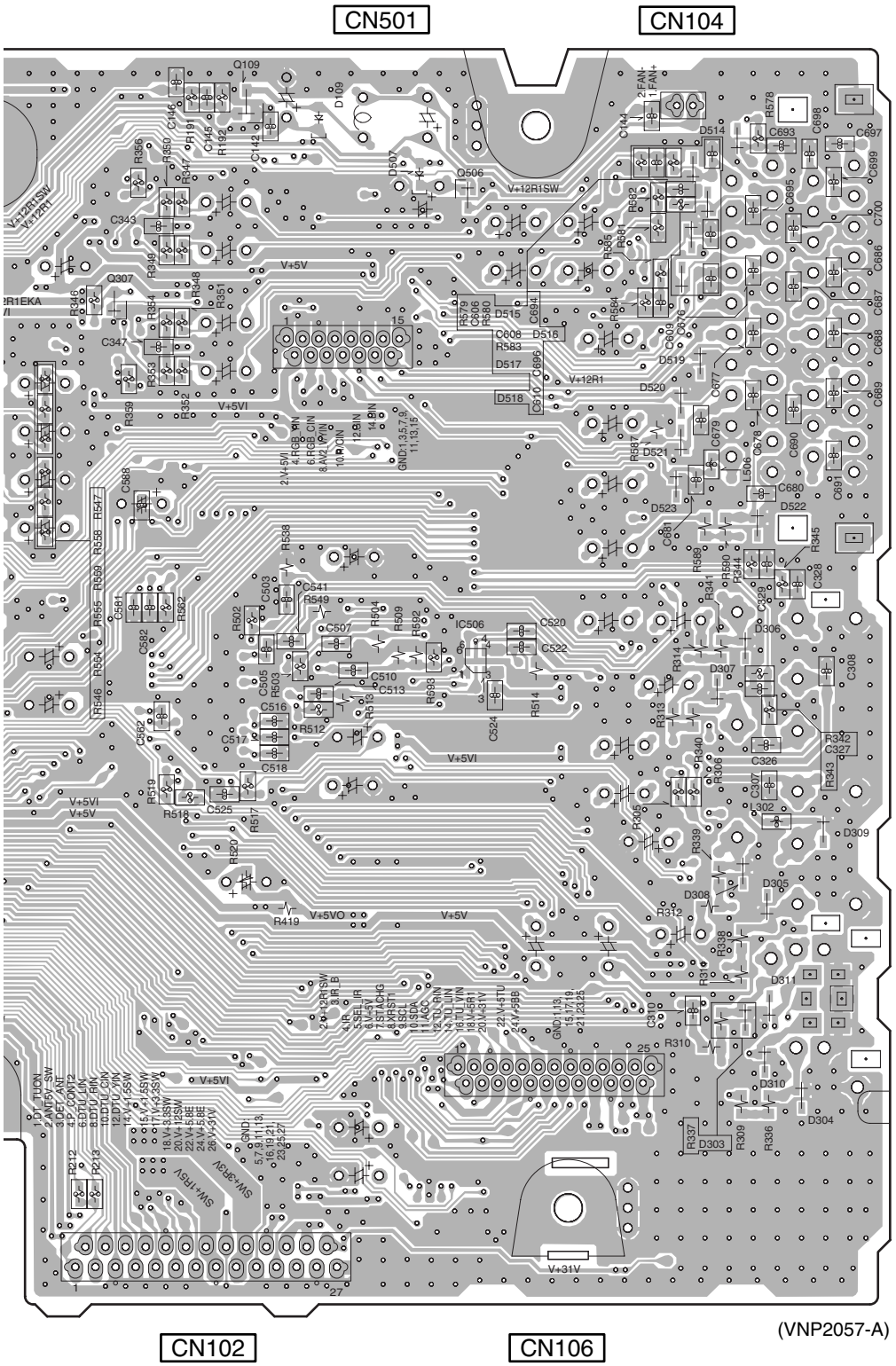

L CN202
CN401
CN105
D CN301
CN102
CN103
CN101
G CN2301
VWV2266
VWV2275
PC
LF
VWV
JACB
ICT
FC
IC401
TYPE 494.500NB
MFD.BY
LITTELFUSE INC
(VNP2057-A)

SIDE B

A JACB ASSY



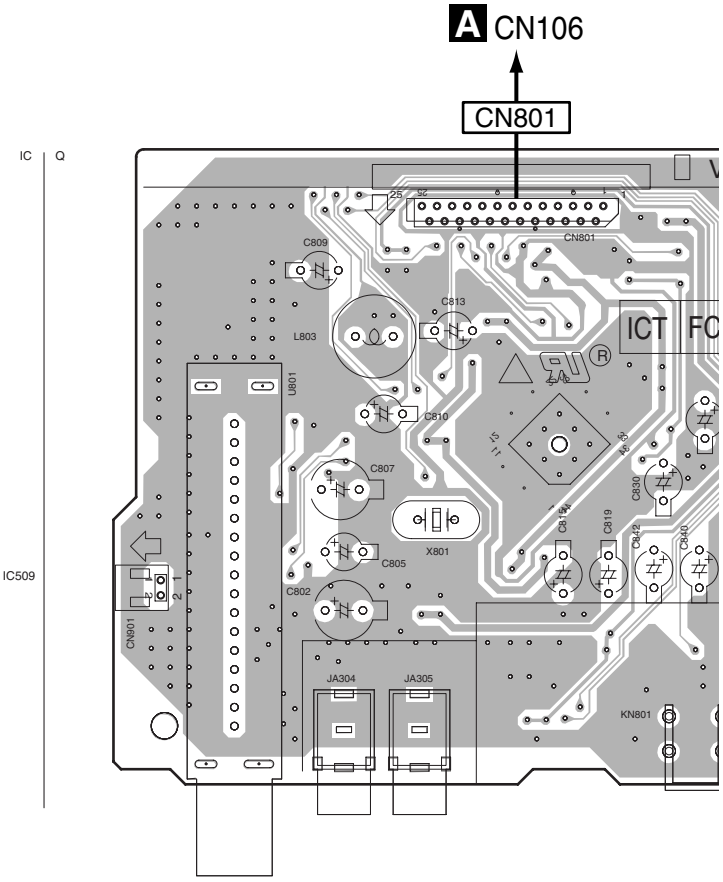
SIDE B


CN501
CN104
CN102
CN106
Q109
Q506
Q307
Q401
Q402
Q403
IC506
V+5V
V+5VI
V+12R1SW
V+31V
V+5VO
(VNP2057-A)

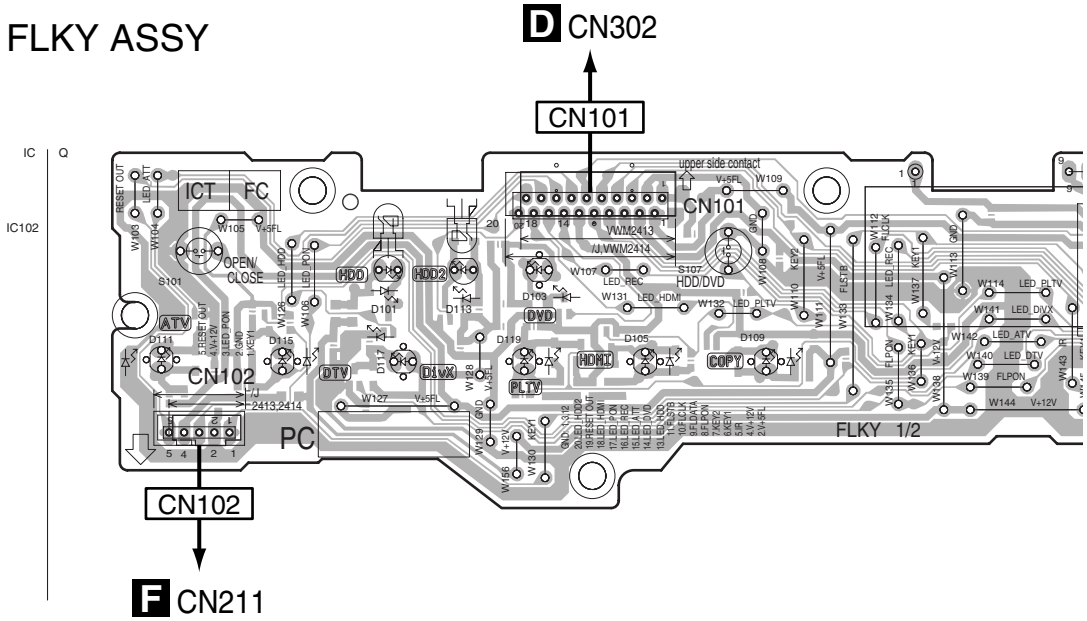
4.2 TUNB and FLKY ASSYS

SIDE A

B TUNB ASSY



E FLKY ASSY



B **E**

SIDE A

A

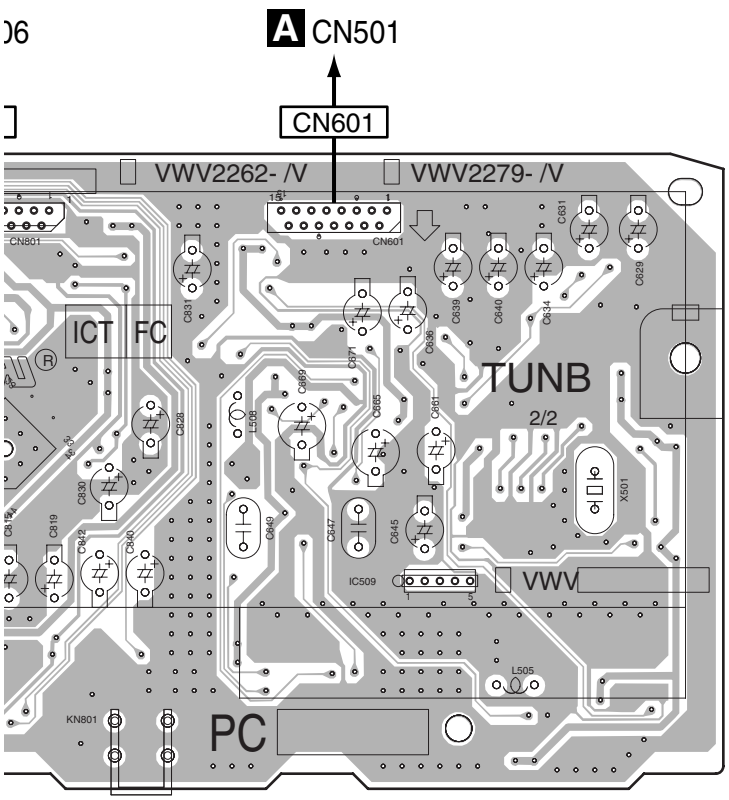
B

C

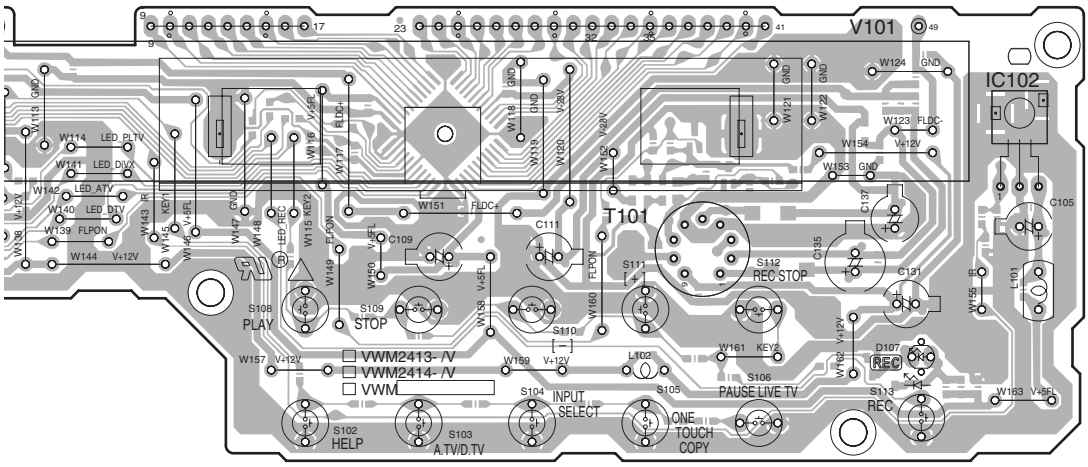
D

E

F



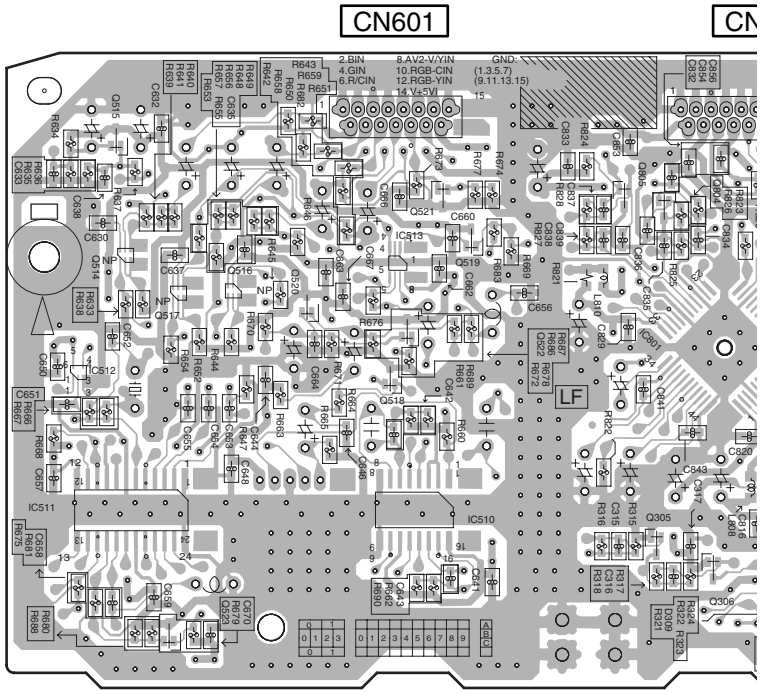
(VNP2058-A)



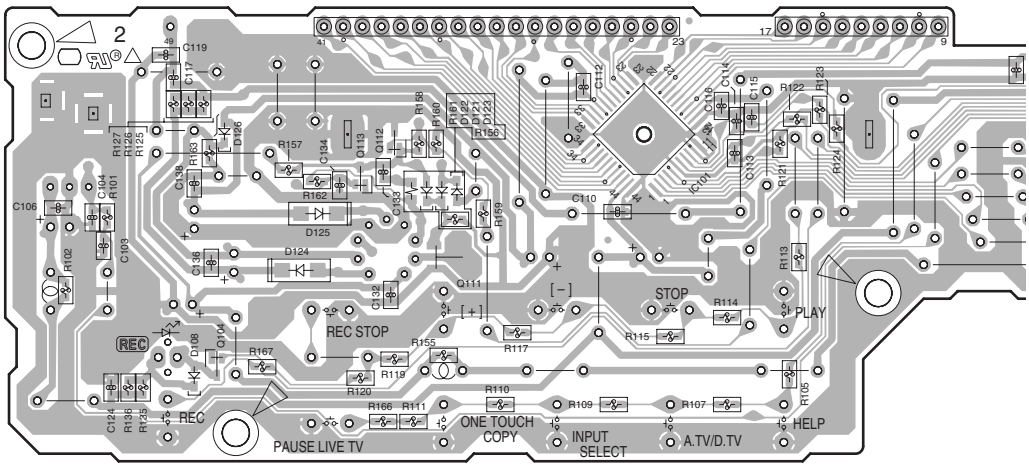
(VNP2059-A)

SIDE B

B TUNB ASSY

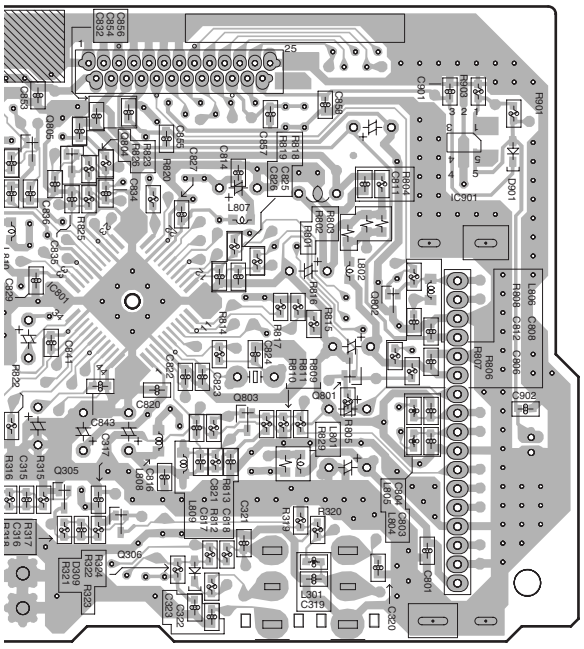


E FLKY ASSY



SIDE B

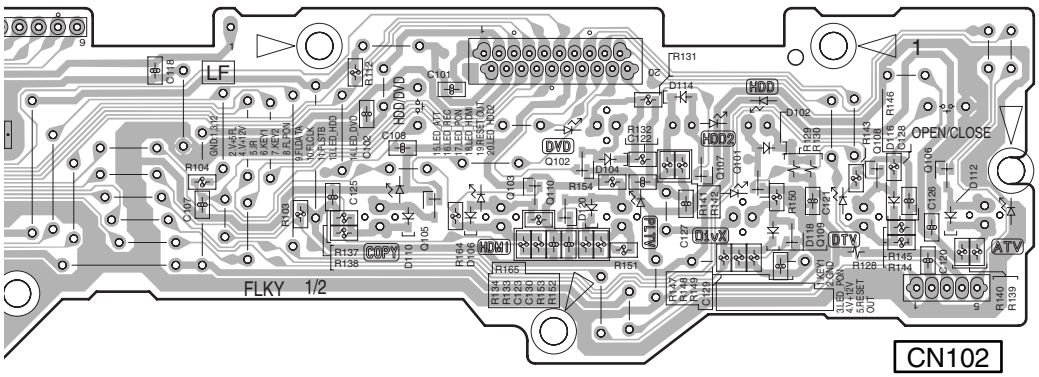
CN801



IC	Q
	Q515
	Q805
	Q804
	Q521
IC513 IC901	Q514 Q519 Q516 Q520
IC801	Q517 Q522 Q802
IC512	Q518
	Q803 Q801
IC511 IC510	Q305
	Q523 Q306

(VNP2058-A)

CN101



IC	Q
IC101	Q113 Q112 Q108 Q102 Q101 Q106 Q107 Q103 Q110
	Q105 Q109
	Q111
	Q104

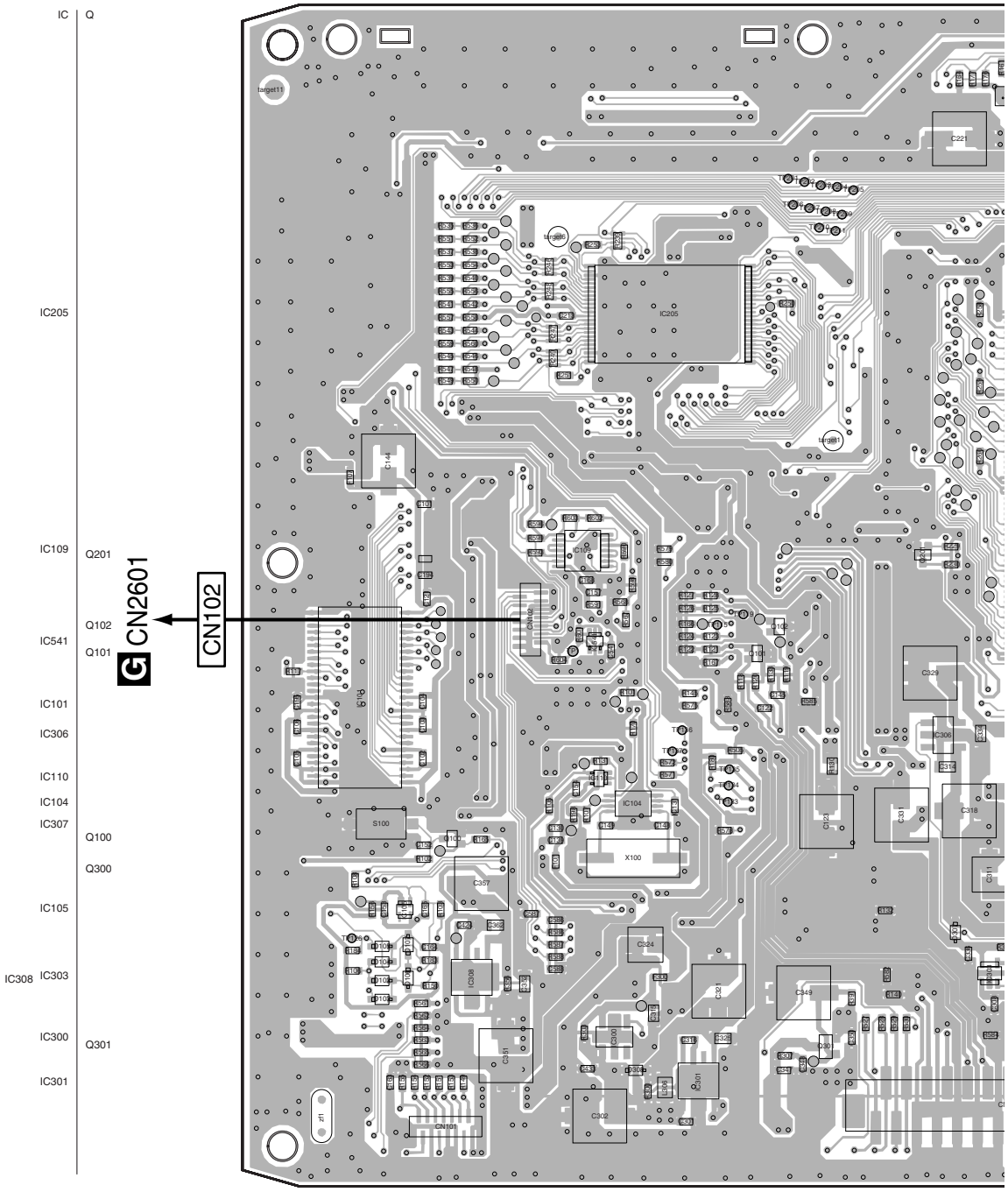
CN102

(VNP2059-A)

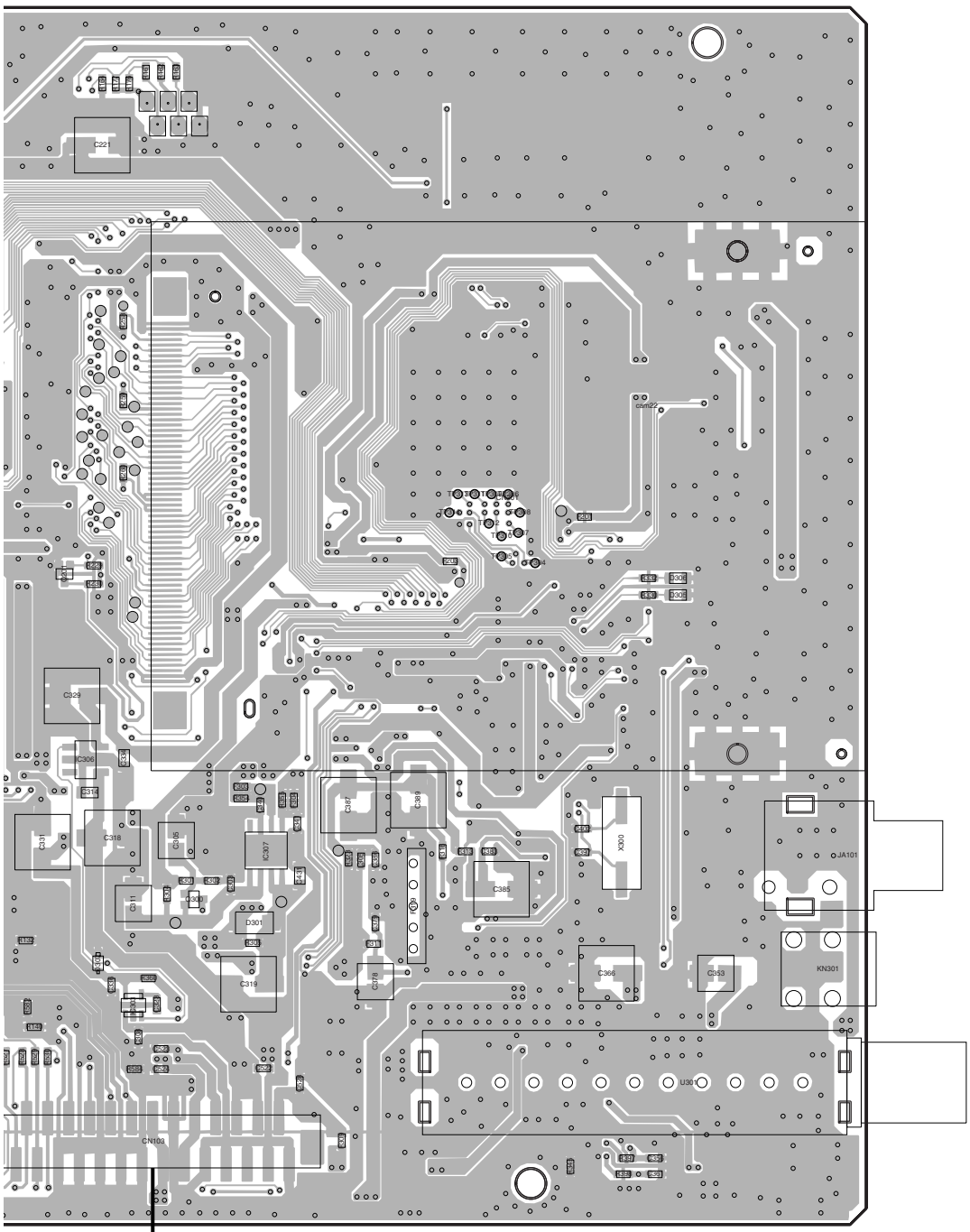
4.3 DTBR ASSY

SIDE A

C DTBR ASSY



SIDE A



(VNP2055-B)

CN103

A CN102

SIDE B

A

B

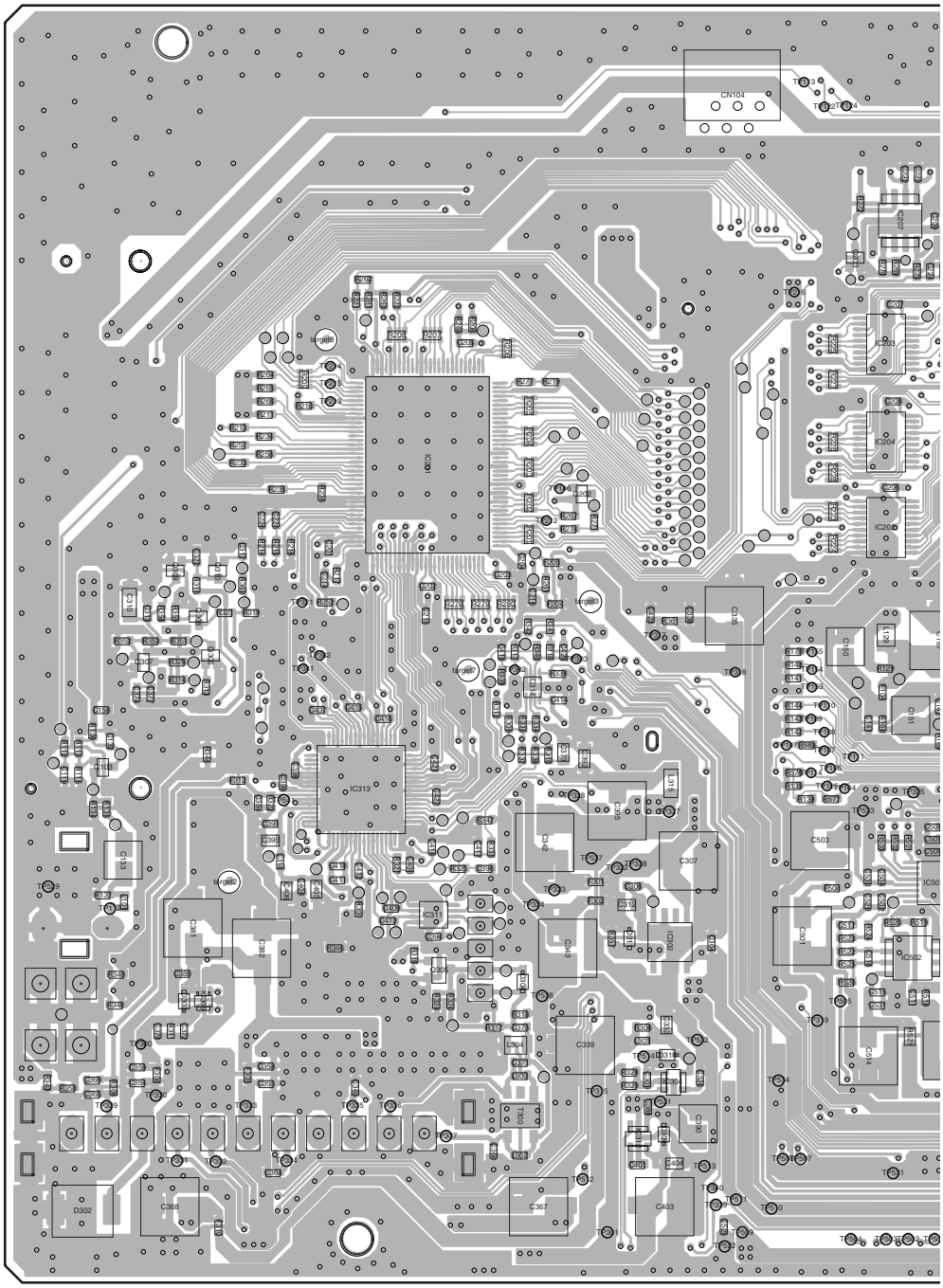
C

D

E

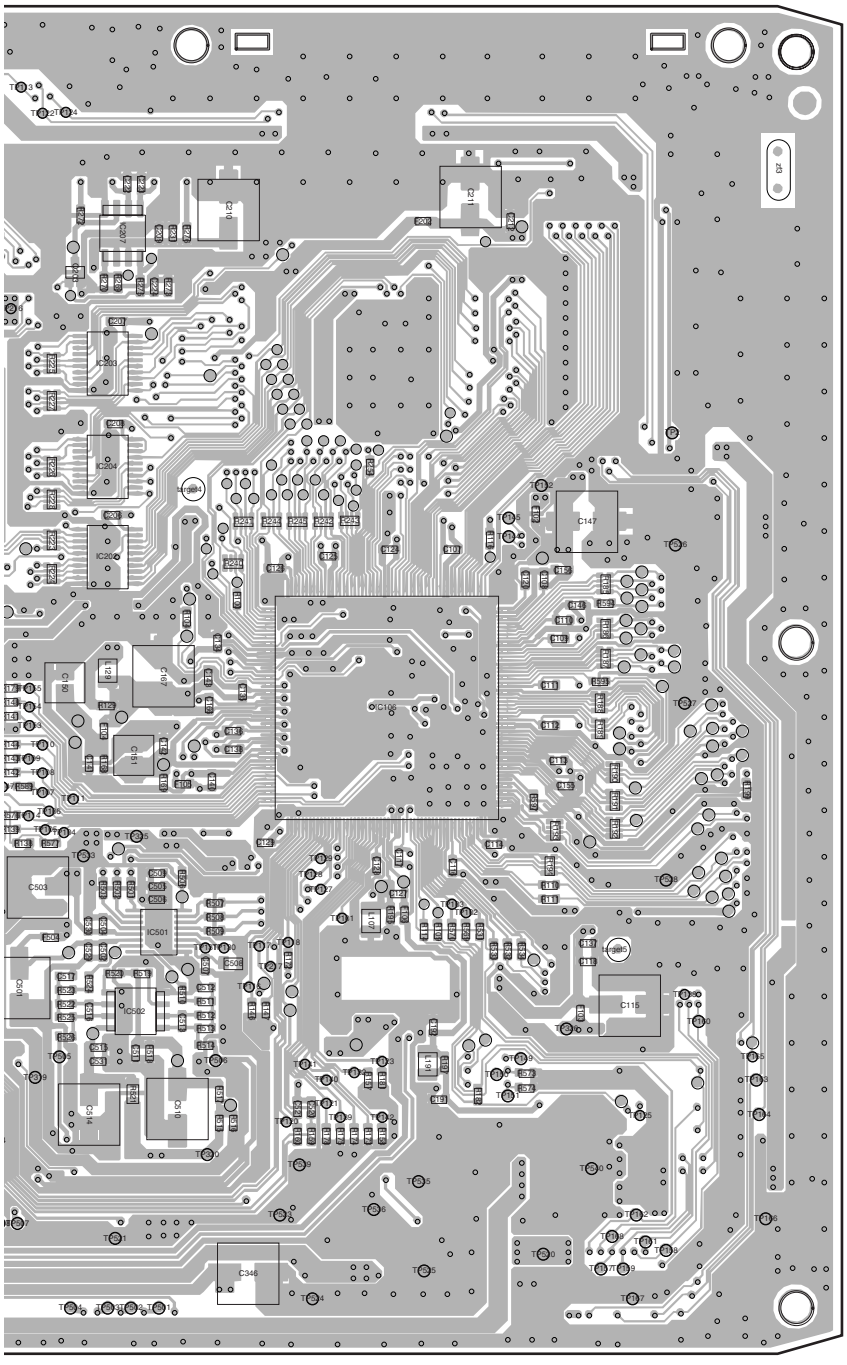
F

C DTBR ASSY



CN103

SIDE B



(VNP2055-B)

CN102

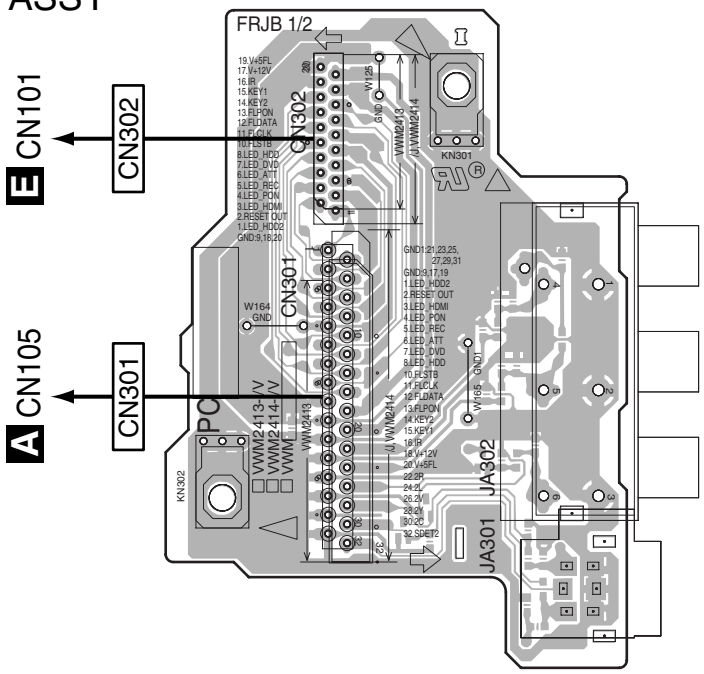
IC	Q
IC207	
	Q203
IC203	
IC204	
IC201	
	Q202
IC202	
	Q309 Q310
	Q308
	Q306
IC106	Q307
IC314	
	Q103
IC313	
IC501	
IC311	
IC302	
IC502	
	Q305
IC309	
IC304	
IC312	

5 6 7 8

4.4 FRJB, PWSB and ATAB ASSYS

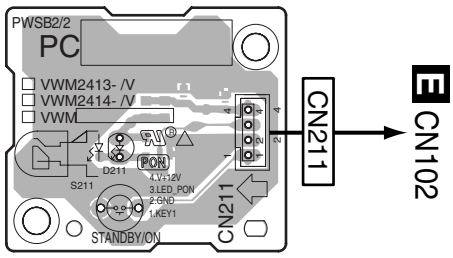
SIDE A **SIDE A**

D FRJB ASSY



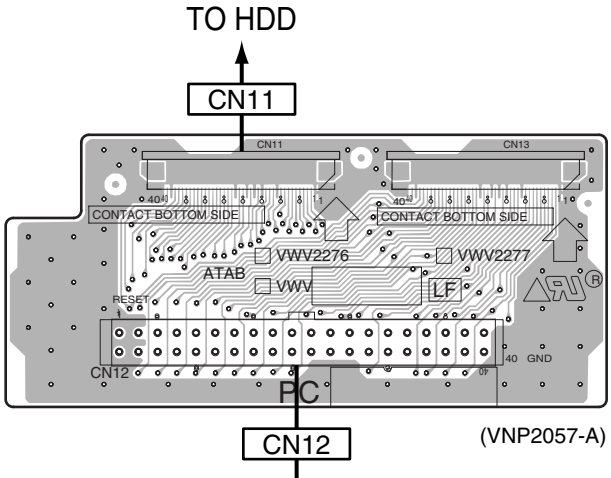
(VNP2059-A)

F PWSB ASSY



(VNP2059-A)

K ATAB ASSY

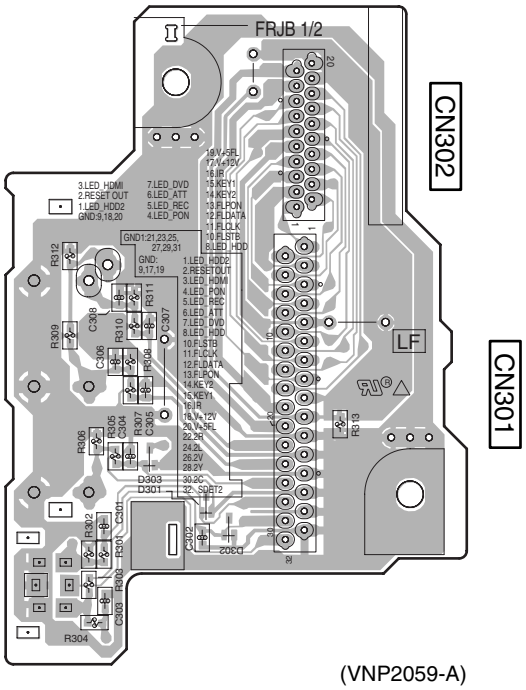


(VNP2057-A)

SIDE B

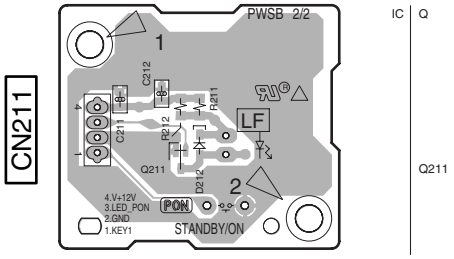
SIDE B

D FRJB ASSY



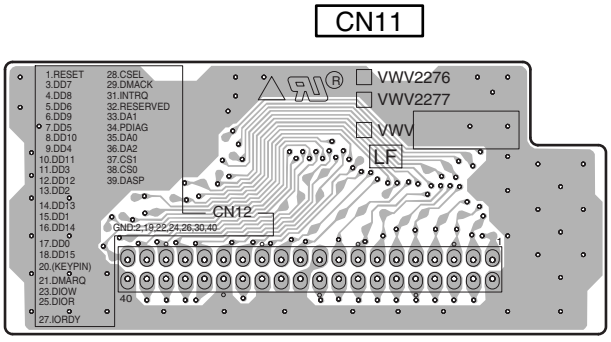
(VNP2059-A)

F PWSB ASSY



(VNP2059-A)

K ATAB ASSY



(VNP2057-A)

4.5 MAIN ASSY

SIDE A

A

B

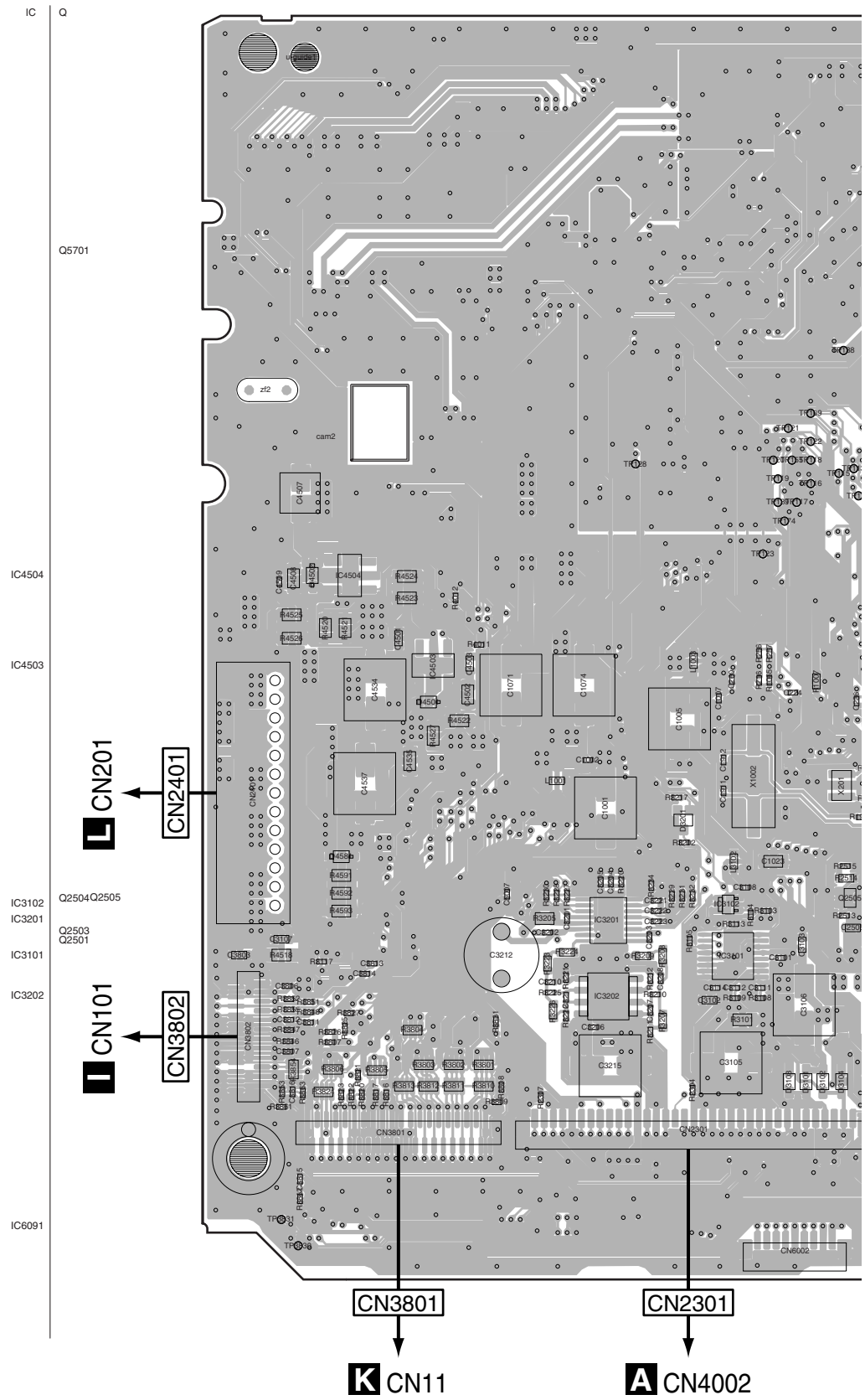
C

D

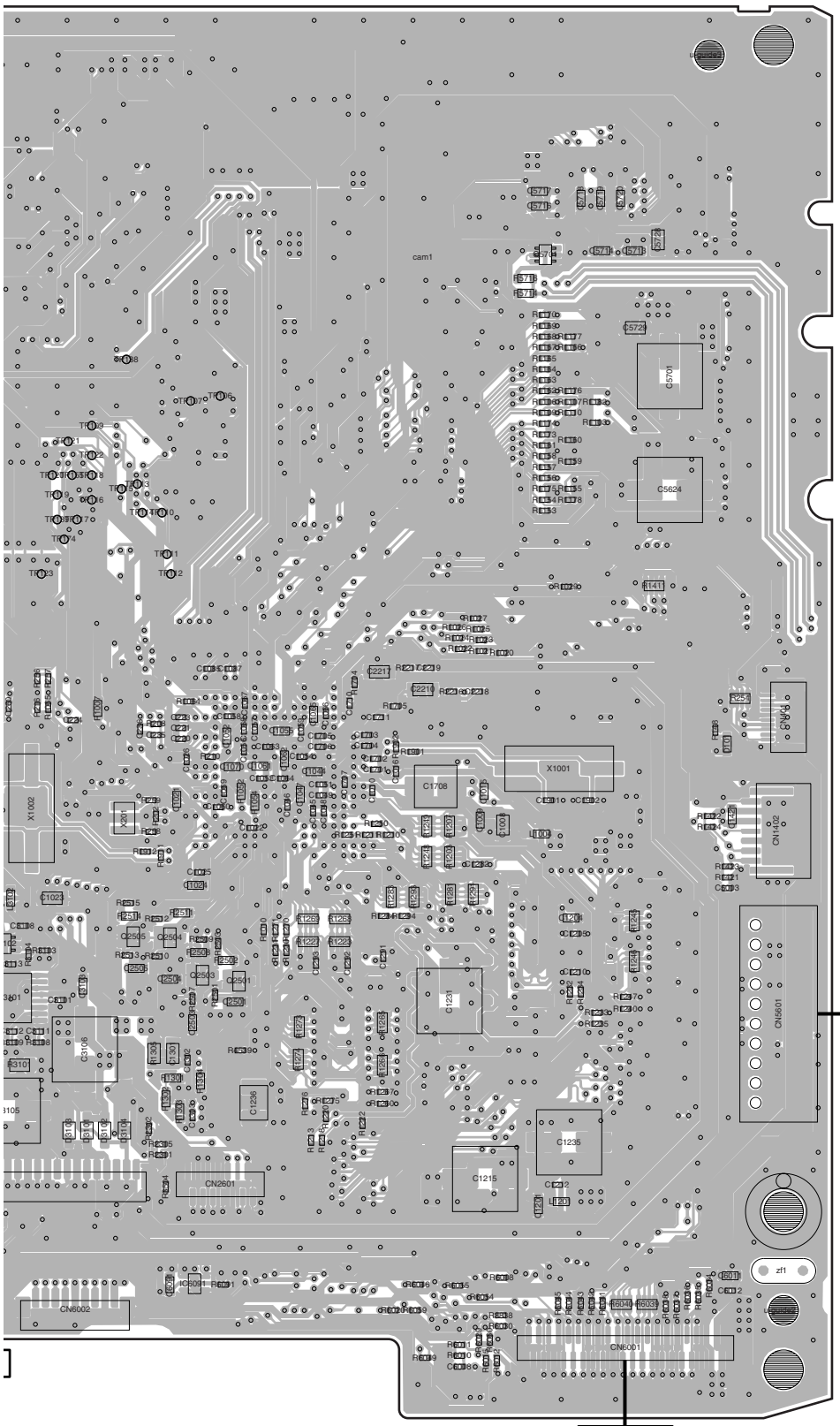
E

F

G MAIN ASSY

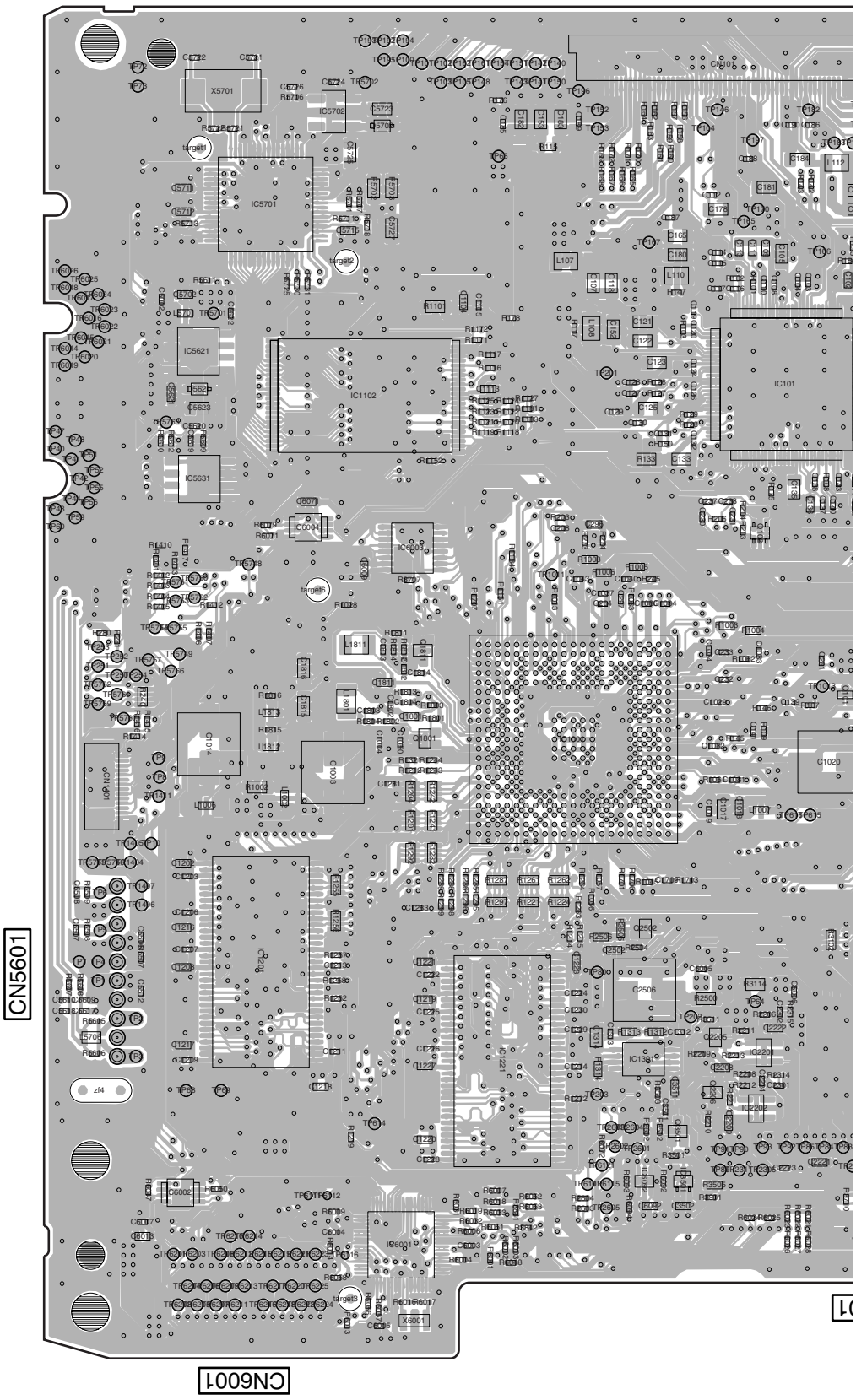


SIDE A

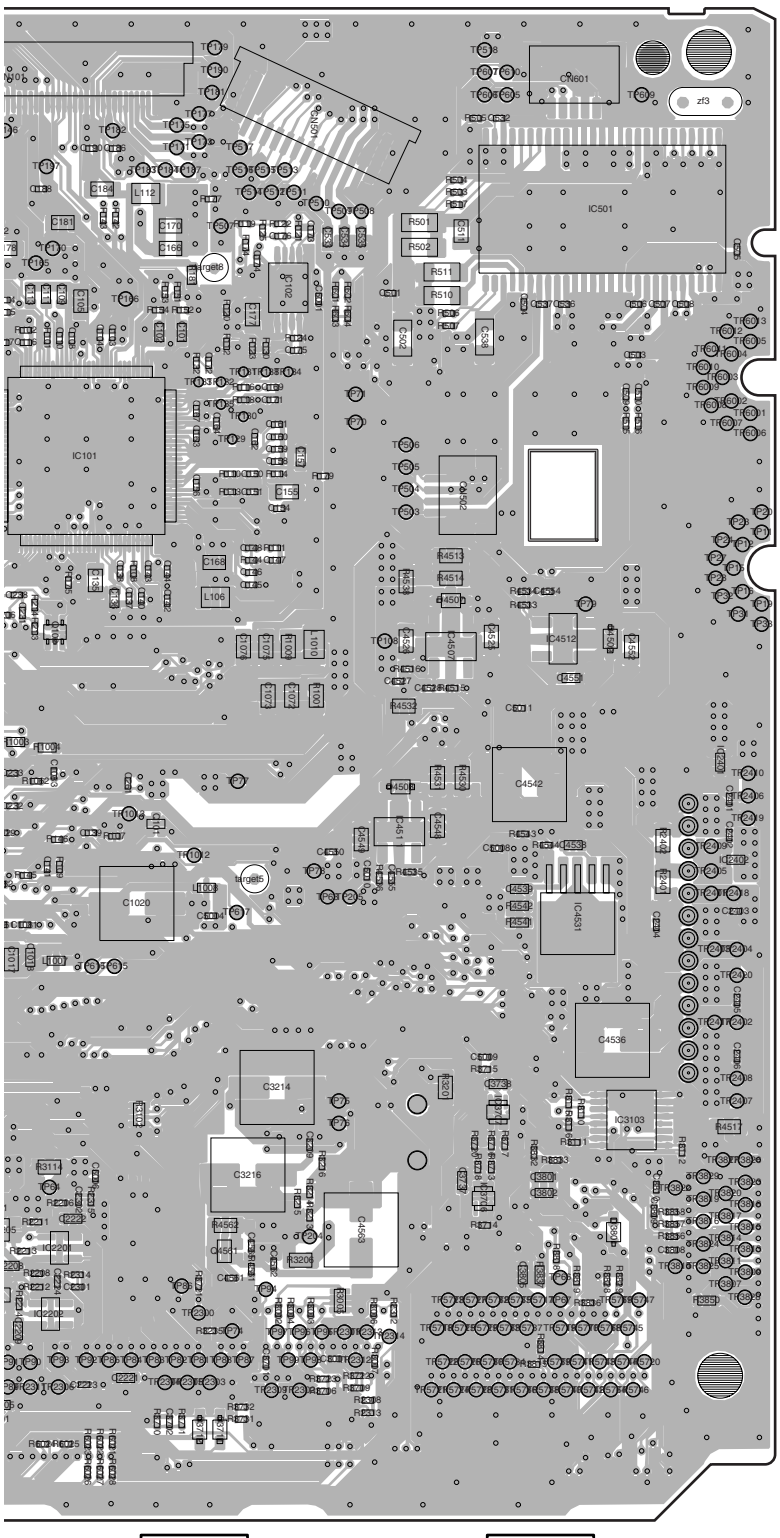


SIDE B

G MAIN ASSY



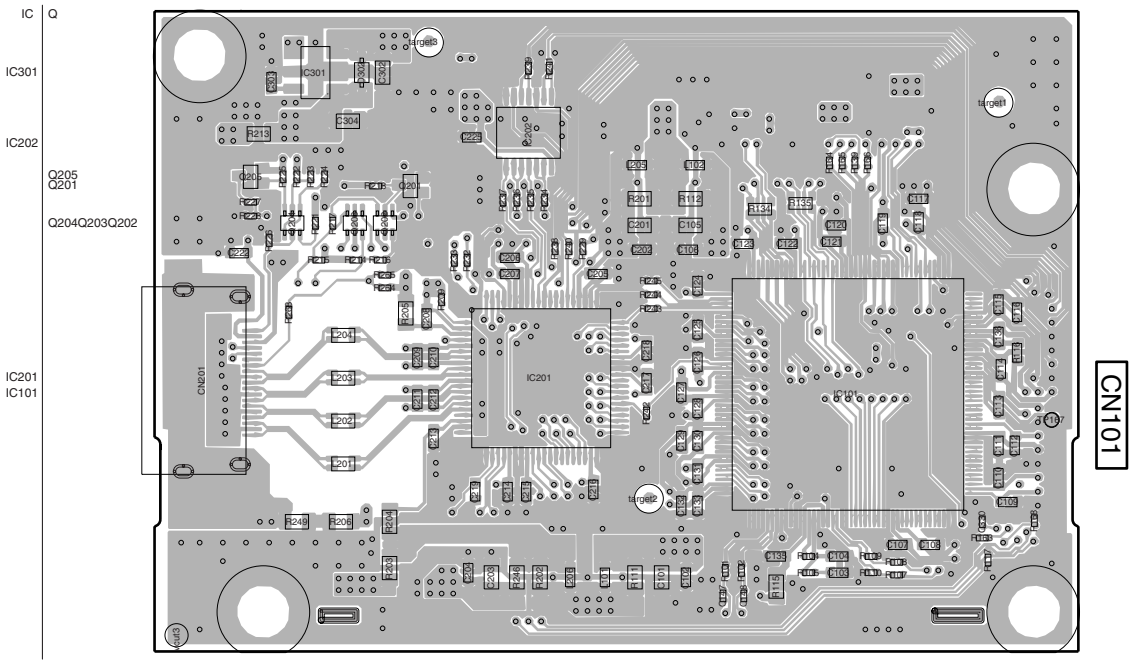
SIDE B


CN2301
CN3801
(VNP2052-A)
CN2401
CN3802
IC
Q
IC5702
IC501
IC5701
IC102
IC5621
IC101
IC1102
IC5631
IC6004
IC4512
IC6003
IC4507
Q102
IC2401
Q1811
IC451
Q101
IC2402
IC1001
Q1801
IC4531
IC3707
IC3103
IC1201
Q2502
IC3706
Q2205
IC2201
IC1221
IC1301
Q4561
Q2206
IC2202
Q3501
IC6092
IC3501
IC6002
IC6001

4.6 HDMIB ASSY

SIDE A

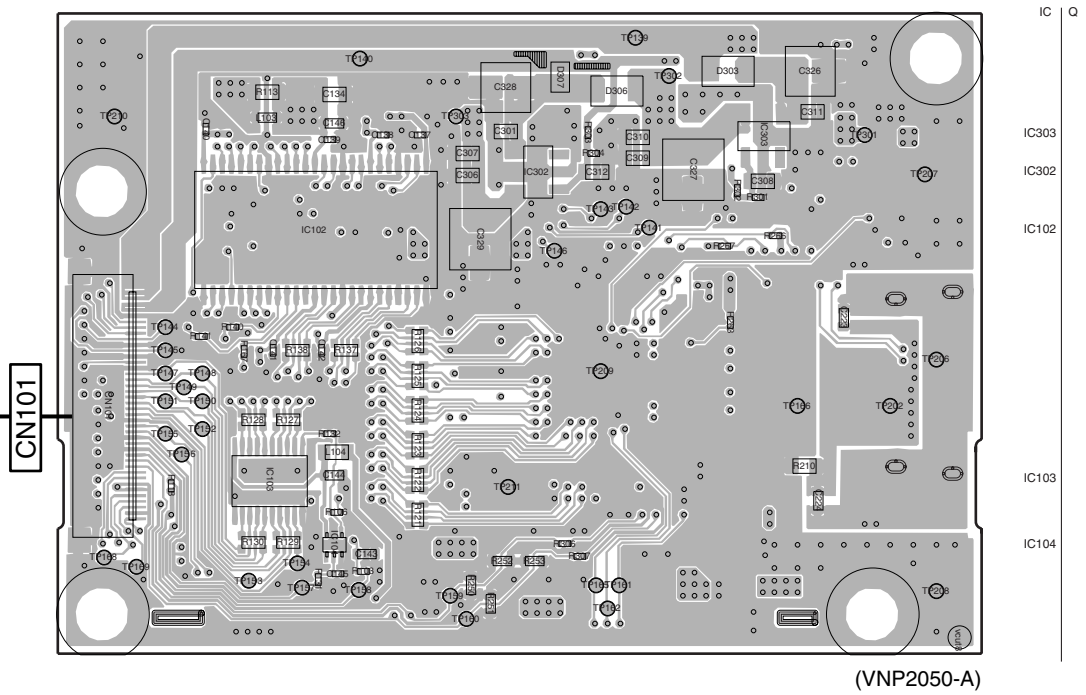
H HDMIB ASSY



(VNP2050-A)

SIDE B

H HDMIB ASSY



G CN6001

4.7 DVJB ASSY

SIDE A

SIDE A

IC | Q

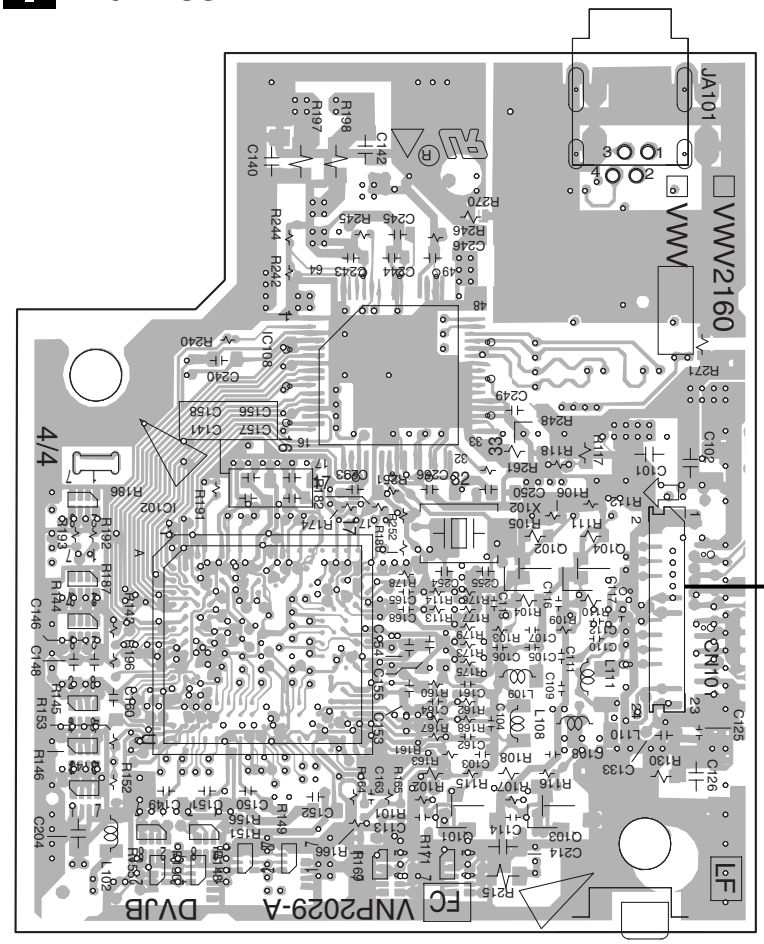
IC108

IC102

Q102 Q104

Q101 Q103

DVJB ASSY



(VNP2029-A)

SIDE B

SIDE B

DVJB ASSY

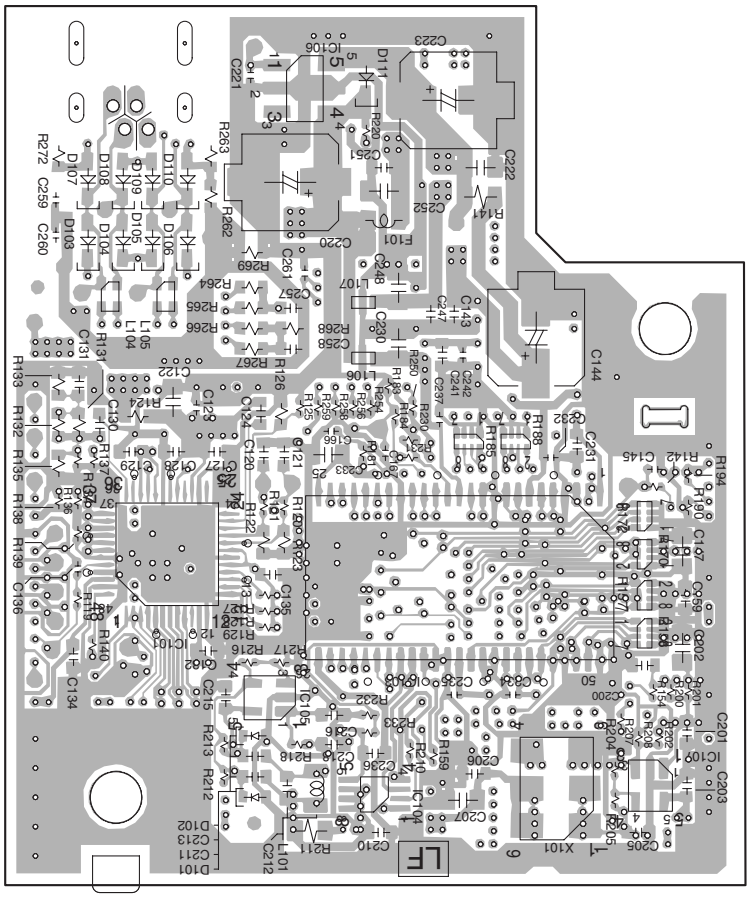
IC

IC106

IC101
IC103
IC105

IC107
IC104

Q

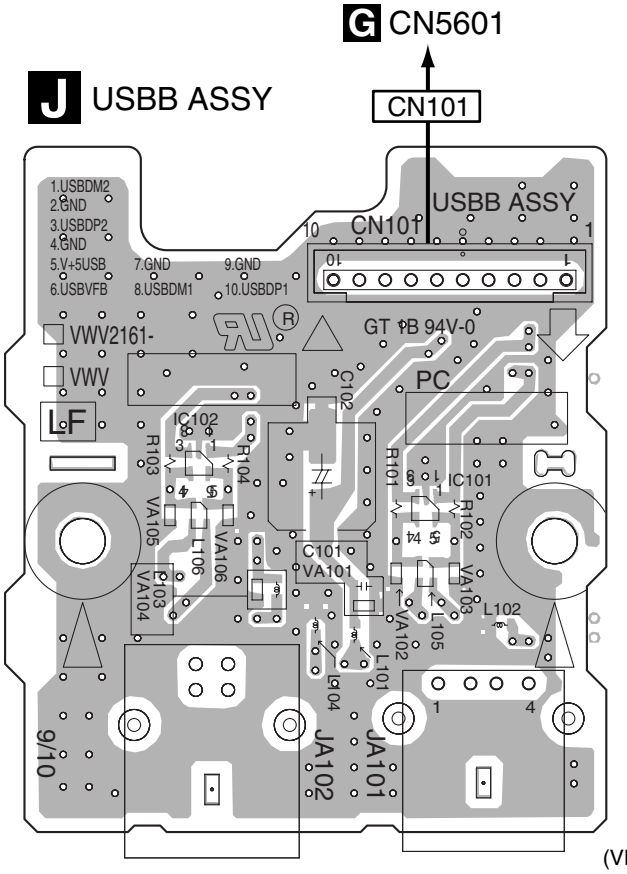


(VNP2029-A)

4.8 USBB ASSY

SIDE A

SIDE A



(VNP2030-A)

J

J

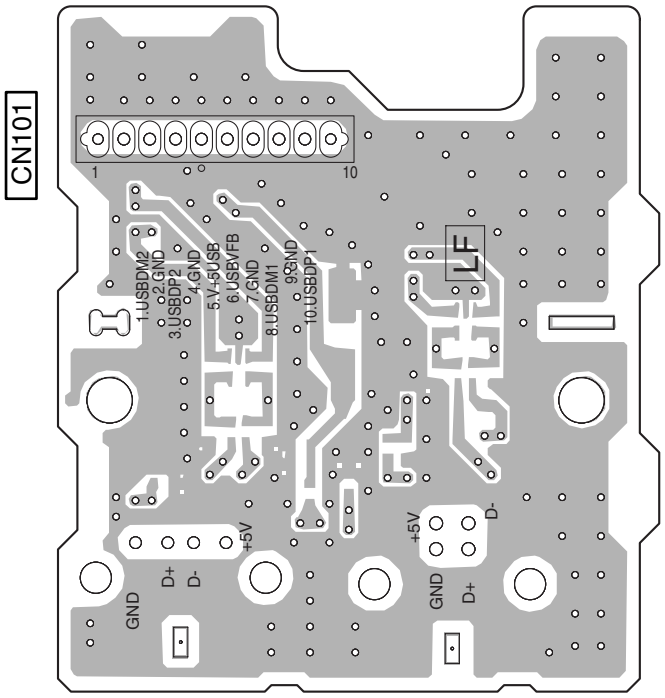
SIDE B

SIDE B

A

B

J USBB ASSY



(VNP2030-A)

C

D

E

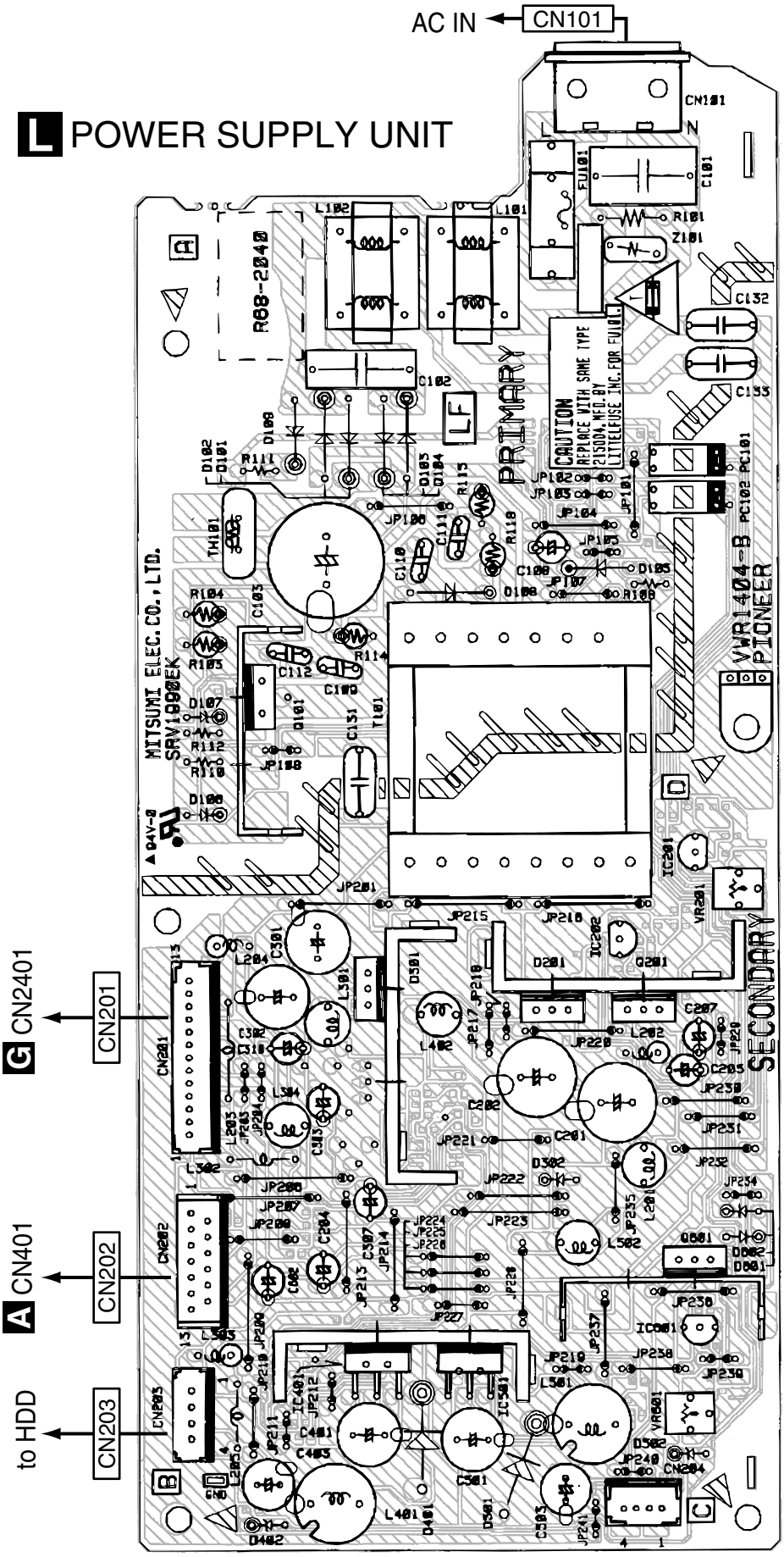
F

J

J

4.9 POWER SUPPLY UNIT

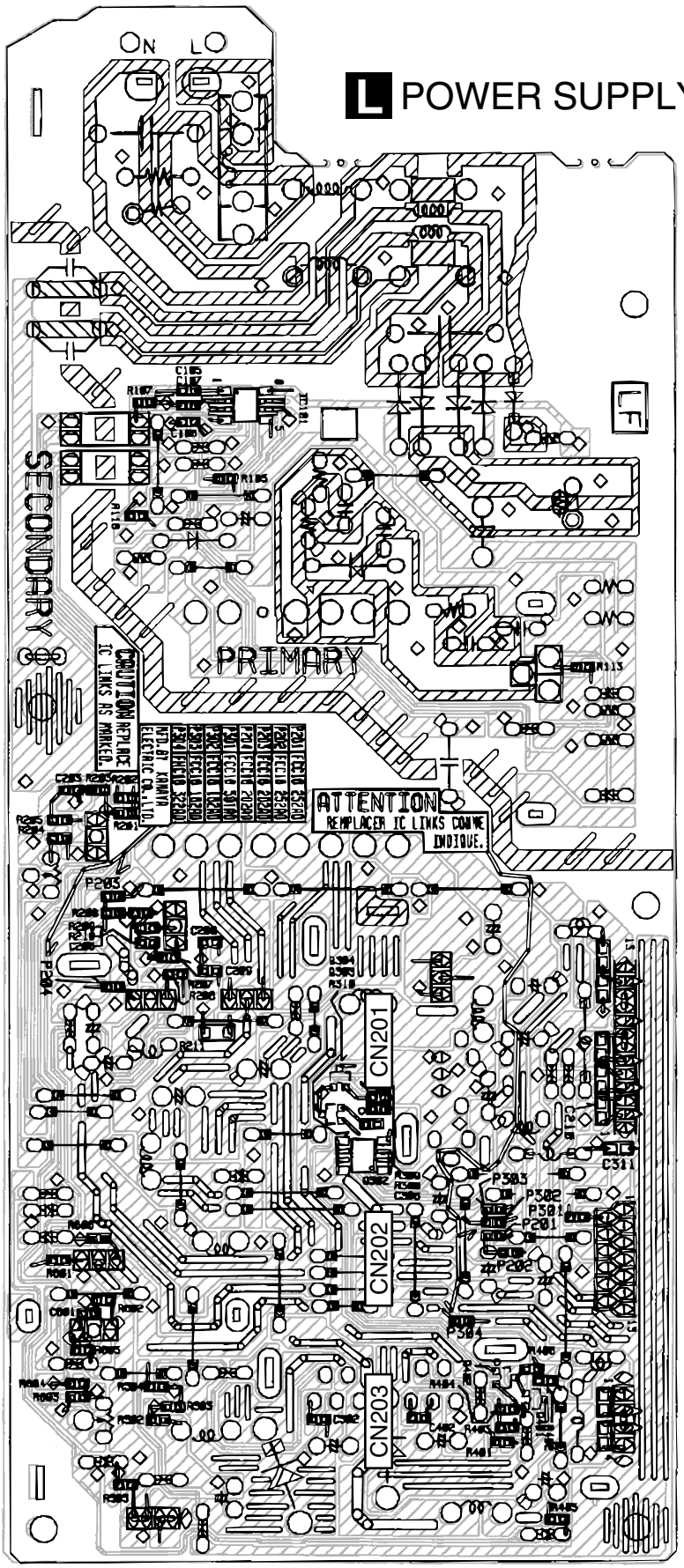
SIDE A



SIDE B

CN101

L POWER SUPPLY UNIT



5. PCB PARTS LIST

NOTES: ● *Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.*
● *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
● *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560 Ω	→ *56 x 10¹* →	*561*	*RD1/4PU 5 6 1 J*
47k Ω	→ *47 x 10³* →	*473*	*RD1/4PU 4 7 3 J*
0.5 Ω	→	*R50*	*RN2H R 5 0 K*
1 Ω	→	*1R0*	*RS1P 1 R 0 K*

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω	→ *562 x 10¹* →	*5621*	*RN1/4PC 5 6 2 1 F*

LIST OF ASSEMBLIES

Mark	No.	Description	Part No.
	1	TUNB ASSY	VWV2262
NSP	1	JACB ASSY	VWM2415
NSP	2	JACB ASSY	VWV2266
	3	JACB ASSY (for Service)	VXX3172
NSP	2	ATAB ASSY	VWV2276
NSP	1	DTBR ASSY	VWM2417
NSP	2	DTBR ASSY	VWV2271
	3	DTBR ASSY (for Service)	VXX3174
NSP	1	FLKB ASSY	VWM2413
	2	FLKY ASSY	VWG2592
	3	FLKY ASSY (for Service)	VXX3177
	3	PWSB ASSY (for Service)	VXX3178
	3	FRJB ASSY (for Service)	VXX3179
	1	MAIN ASSY (for Service)	VXX3159
	1	HDMIB ASSY	VWV2247
	1	DVJB ASSY	VWV2160
	1	USBB ASSY	VWV2161
⚠	1	POWER SUPPLY UNIT	VWR1404

A JACB ASSY

SEMICONDUCTORS

Mark	No.	Description	Part No.
	IC0303-IC0305, IC0505		BA4560RF
	IC0102		BD4846G
	IC0302		BU4052BCFV
	IC0103		BU4220G
⚠	IC0401		CEK1278
	IC0501		HA118326APFR
	IC0503		MM1501XN
	IC0502, IC0504, IC0506		MM1503XN
	IC0101		PMC015A8
	IC0508		TC7W53FU
	Q0406, Q0412, Q0415		2SA1036K
	Q0503, Q0504, Q0510		2SA1576A
	Q0408, Q0413, Q0416		2SC2411K
	Q0102, Q0111, Q0112, Q0401, Q0403		2SC4081
	Q0511-Q0513		2SC4081
	Q0402		2SC5876
	Q0105, Q0109, Q0303, Q0304, Q0502		2SD2114K
	Q0301, Q0506		DTA124EUA
	Q0110		DTA143EUA
	Q0108		DTC114TUA
	Q0101, Q0302, Q0307, Q0407, Q0414		DTC124EUA
	Q0417, Q0501		DTC124EUA
	Q0404		HN1A01FU
	Q0507, Q0508		HN1C03FU
	Q0409		RN4903
	Q0103, Q0104		UMD2N
	Q0405		UMF21N
	Q0410		UMF23N
	Q0509		UMH1N
	D0104		1SR154-400
	D0101-D0103, D0106, D0107, D0109		1SS355
	D0301, D0302, D0403, D0406, D0507		1SS355
	D0510, D0511		1SS355
	D0512, D0513		DAN217U
	D0108		DAP202U
	D0506		UDZS11(B)
	D0401		UDZS15(B)
	D0508, D0509		UDZS5R1(B)
	D0501		UDZS6R8(B)
	D0407		UDZS9R1(B)
	D0514-D0533		UMZ6R8N

COILS AND FILTERS

Mark	No.	Description	Part No.
	L0101		ATH1109
	L0302, L0506, L0507		CTF1388
	L0402		CTF1399
	L0102		LAU470J
	L0501, L0503		LCYA150J2520
	L0502, L0504		LCYA180J2520
	L0401		LRCA331J

CAPACITORS

Mark	No.	Description	Part No.
	C0111, C0112, C0149		CCSRCH100D50
	C0567, C0568		CCSRCH101J50
	C0326, C0328, C0694, C0696, C0698		CCSRCH102J50
	C0700		CCSRCH102J50
	C0114, C0115		CCSRCH120J50
	C0348, C0350, C0351, C0353		CCSRCH220J50
	C0624, C0625		CCSRCH221J50
	C0538, C0545		CCSRCH330J50
	C0107		CCSRCH331J50
	C0145, C0307, C0308, C0327, C0329		CCSRCH471J50
	C0605, C0606, C0608, C0609		CCSRCH471J50
	C0613, C0614, C0616, C0617, C0693		CCSRCH471J50
	C0695, C0697, C0699		CCSRCH471J50
	C0540, C0547		CCSRCH680J50
	C0537, C0544		CCSRCH7R0D50

Mark No.	Description	Part No.
C0539, C0546		CCSRCH820J50
C0536, C0543		CCSRCJ3R0C50
C0563, C0564		CEANP4R7M50
C0341, C0342, C0345, C0346, C0412		CEAT100M50
C0424, C0514, C0577, C0578		CEAT100M50
C0417, C0419, C0437, C0439, C0523		CEAT101M10
C0530, C0560, C0579		CEAT101M10
C0321, C0432, C0434, C0573-C0575		CEAT101M16
C0618		CEAT101M16
C0119, C0123, C0309, C0311, C0312		CEAT102M6R3
C0611, C0629		CEAT102M6R3
C0504		CEAT1R0M50
C0104		CEAT220M25
C0127, C0301		CEAT221M6R3
C0138		CEAT2R2M50
C0305, C0306		CEAT470M16
C0141		CEAT471M16
C0313, C0314, C0620, C0627, C0628		CEAT471M6R3
C0587, C0604, C0607, C0612, C0615		CEAT4R7M50
C0410		CKSQYF105Z50
C0310, C0509, C0541		CKSRYB103K50
C0157, C0421, C0505, C0508, C0512		CKSRYB104K16
C0517, C0518, C0525, C0535		CKSRYB104K16
C0557, C0558, C0562		CKSRYB104K16
C0110, C0502, C0503, C0507		CKSRYB105K10
C0510, C0511, C0513, C0515, C0520		CKSRYB105K10
C0522, C0527-C0529, C0531-C0534		CKSRYB105K10
C0550, C0552, C0555, C0556		CKSRYB105K10
C0583-C0586, C0589-C0594, C0603		CKSRYB105K10
C0105, C0106, C0109, C0120		CKSRYF104Z25
C0124-C0126, C0131-C0135		CKSRYF104Z25
C0139, C0140, C0142, C0144, C0153		CKSRYF104Z25
C0156, C0318, C0320, C0344		CKSRYF104Z25
C0401-C0407, C0420, C0431, C0433		CKSRYF104Z25
C0435, C0436, C0438, C0441, C0516		CKSRYF104Z25
C0521, C0576, C0581, C0582, C0623		CKSRYF104Z25
C0626		CKSRYF104Z25
C0422, C0425		CKSRYF104Z50
C0113, C0121, C0122, C0150, C0152		CKSRYF105Z10
C0519, C0524, C0526, C0542, C0549		CKSRYF105Z10
C0553, C0561, C0580, C0588		CKSRYF105Z10

RESISTORS

R0554, R0558	RN1/16SE1002D
R0555, R0559	RN1/16SE8201D
R0410, R0419, R0426-R0432	RS1/10S0R0J
R0515, R0516, R0520, R0545, R0561	RS1/10S0R0J
R0627	RS1/10S0R0J
R0336-R0341, R0590, R0609, R0624	RS1/10S3R9J
R0626, R0630	RS1/10S3R9J
R0420	RS1/10S471J
R0611	RS1/10S561J
R0309-R0314, R0589, R0608, R0623	RS1/10S68R0F
R0625, R0629	RS1/10S68R0F
R0504, R0506, R0511, R0514, R0538	RS1/10S75R0F
R0549, R0587, R0592, R0628, R0631	RS1/10S75R0F
R0527	RS1/16S1000F
R0405	RS1/16S1003F
R0526	RS1/16S1800F
R0408	RS1/16S2202F
R0528, R0534	RS1/16S2700F
R0517	RS1/16S3304F
R0202	RS1/16S7500F
Other Resistors	RS1/16S###J

OTHERS

X0101	CSS1653
X0102 (32k)	VSS1197
JA0501 RGB CONNECTOR	AKB1316
0301 2P 4PIN MINIDIN	AKP1234
CN0104 KR CONNECTOR	B2B-PH-K-S
CN0105 30P FFC CONNECTOR	HLEM30S-1
JA0302 9P PIN JACK	VKB1238
CN0501 15P FFC CONNECTOR	VKN1246
CN0106 25P FFC CONNECTOR	VKN1256
CN0102 B TO B CONNECTOR	VKN2008
CN0103 9P FFC CONNECTOR	VKN2015
CN0101 35P FFC CONNECTOR	VKN2025
CN0401 B TO B CONNECTOR	VKN2052
KN0101, KN0103, KN0104 WRAPPING TERMINAL	VNF1084

B TUNB ASSY

SEMICONDUCTORS

IC0511	BH7236AF
IC0509	LA7213
IC0801	MSP3417G
IC0512	TC7SU04FU
Q0306, Q0518, Q0521, Q0523	2SA1576A
Q0801, Q0802, Q0804, Q0805	2SA1576A
Q0305, Q0515, Q0803	2SC4081
Q0514, Q0516, Q0517	HN1C01FU
D0309	1SS355

COILS AND FILTERS

L0301, L0804, L0805	CTF1306
L0801, L0802, L0807, L0810	CTF1399
L0505	LAU680J
L0809	LCYA100J2520
L0808	LCYA101J2520

CAPACITORS

C0315, C0316, C0319, C0817	CCSRCH101J50
C0658, C0825, C0826	CCSRCH220J50
C0651, C0652	CCSRCH270J50
C0821, C0822	CCSRCH560J50
C0836, C0839	CCSRCH561J50
C0823, C0824	CCSRCH5R0C50
C0321	CCSRCH681J50
C0805, C0830, C0842	CEAT100M50
C0629, C0631, C0640, C0813, C0815	CEAT101M10
C0819, C0828, C0831	CEAT101M10
C0802, C0807	CEAT102M6R3
C0634, C0636, C0639, C0671	CEAT221M6R3
C0645	CEAT2R2M50
C0840	CEAT3R3M50
C0818, C0834, C0837	CKSRYB103K50
C0653-C0655	CKSRYB104K16
C0646	CKSRYB221K50
C0801, C0806	CKSRYB222K50
C0835, C0838	CKSRYB392K50

Mark	No.	Description	Part No.
	C0317, C0322, C0630, C0632, C0633		CKSRYF104Z25
	C0635, C0637, C0638, C0644, C0648		CKSRYF104Z25
A	C0650, C0657, C0659, C0814, C0816		CKSRYF104Z25
	C0829, C0832, C0833, C0841, C0843		CKSRYF104Z25
	C0820, C0827		CKSRYF105Z10
	RESISTORS		
	R0821		RS1/10S0R0J
	R0801, R0802		RS1/10S100J
	R0803, R0829		RS1/10S120J
	R0633, R0644, R0652		RS1/16S1001F
	R0640, R0648, R0657		RS1/16S1002F
	R0641, R0649, R0656		RS1/16S6800F
	R0642, R0650, R0658		RS1/16S82R0F
B	Other Resistors		RS1/16S###J
	OTHERS		
	U0801	TV TUNER PACK	VXF1113
	JA0304, JA0305	REMOCON JACK	RKN1004
	CN0801	CONNECTOR	VKN1201
	CN0601	15P FFC CONNECTOR	VKN1246
	KN0801	SCREW PLATE	VNE1948
	X0801 (18.432MHz)		VSS1189
	X0501 (4.433619MHz)		VSS1201

C

C DTBR ASSY

SEMICONDUCTORS

IC0201		CIMAXSP2L
IC0309		FPF2007
IC0101		HY57V561620FTP-H
IC0104		KA5SDKAS01TSN
IC0304, IC0312		MM1685AN
IC0307		MM1689FH
IC0501		PCM1742KE
IC0306		S-1170B50UC-OUJ
D IC0207		ST890CDR
IC0313		STV0361L
IC0202		TC74LCX245FTS1
IC0203, IC0204		TC74LCX373FT
IC0109		TC74VHC00FTS1
IC0110		TC7SH04FUS1
IC0314		TC7WB125FK
IC0311		UPC3221GV
IC0502		UPC4570G2-A
IC0106		UPD61110GM-100UEVA
IC0205		VYW2391
E Q0101, Q0102, Q0306		2SA1576A
Q0301		2SC2411K
Q0305		2SC2412K
Q0103, Q0203, Q0307, Q0308		2SC4081
Q0202		DTA143EUA
Q0201		DTC124EUA
Q0309, Q0310		DTC143EUA
D0301		1SR154-400
D0303, D0304		1SS355
D0302		SM15T6V8A

F

COILS AND FILTERS

L1020, L1070		DTL1106
L0304		LCYAR82J2520
F0101, F0103-F0106, F0201-F0206		VTF1091
F0300-F0302, F0305, F0306		VTF1091
F0309-F0313, F0316-F0318, F0504		VTF1091
L0315		XTX1001
L0314		XTX1003

TRANSFORMERS

T0300		XTX1005

CAPACITORS

C0310		CCG1191
C0370, C0513, C0516		CCSRCH101J50
C0119		CCSRCH470J50
C0326, C0401		CCSRCH471J50
C0397, C0402		CCSRCH5R0C50
C0512, C0517		CCSRCH681J50
C0148, C0149		CCSRCK2R0C50
C0353, C0378		CEVW100M16
C0123, C0144, C0167, C0307, C0318		CEVW101M16
C0346, C0349, C0501, C0503, C0510		CEVW101M16
C0514		CEVW101M16
C0133, C0151		CEVW1R0M50
C0324		CEVW220M6R3
C0115, C0147, C0210, C0211, C0221		CEVW470M16
C0329, C0335, C0339, C0342, C0343		CEVW470M16
C0366, C0368, C0381, C0382, C0385		CEVW470M16
C0389, C0395		CEVW470M16
C0508		CKSQYB106K6R3
C0332, C0373, C0392, C0393		CKSQYB225K10
C0404-C0406, C0431		CKSQYB225K10
C0314, C0315, C0334		CKSQYB475K6R3
C0369		CKSRYB102K50
C0375, C0391, C0408, C0410		CKSRYB103K50
C0384, C0396, C0400, C0409, C0413		CKSRYB104K16
C0222, C0301, C0304, C0309, C0338		CKSRYB105K10
C0340, C0341, C0388, C0411		CKSRYB105K10
C0528		CKSRYB223K50
C0102-C0104, C0106, C0108-C0110		CKSRYF104Z25
C0112, C0114, C0116, C0118, C0120		CKSRYF104Z25
C0124, C0125, C0127, C0128		CKSRYF104Z25
C0130, C0131, C0134, C0135, C0138		CKSRYF104Z25
C0140-C0142, C0154, C0155, C0166		CKSRYF104Z25
C0168, C0201-C0209, C0212, C0213		CKSRYF104Z25
C0347, C0348, C0350, C0358, C0359		CKSRYF104Z25
C0364, C0372, C0379, C0380, C0383		CKSRYF104Z25
C0394, C0398, C0399, C0407, C0412		CKSRYF104Z25
C0414-C0418, C0421-C0423, C0502		CKSRYF104Z25
C0504, C0507, C0511, C0515		CKSRYF104Z25
C0522-C0525		CKSRYF104Z25
C0101, C0105, C0107, C0111, C0113		CKSRYF105Z10
C0117, C0121, C0122, C0126, C0129		CKSRYF105Z10
C0132, C0136, C0137, C0303		CKSRYF105Z10

RESISTORS

R0278-R0280		RAB4CQ101J
R0185-R0194		RAB4CQ330J
R0201-R0209, R0223-R0228		RAB4CQ470J
R0239-R0249		RAB4CQ470J
R0511, R0517, R0523		RN1/16SE1002D
R0516		RN1/16SE1201D
R0513, R0518, R0525		RN1/16SE2202D
R0521		RS1/10S0R0J

Mark	No.	Description	Part No.
	R0121-R0128		RS1/16S1000F
	R0169		RS1/16S1500F
	R0168		RS1/16S2200F
	R0135		RS1/16S75R0F
	R0166, R0167		RS1/16S9100F
	Other Resistors		RS1/16S###J

OTHERS

	X0100 (27.0000MHz)		BSS1123
	X0300 (27MHz)		XSS1010
	CN0201	CONNECTOR	CKS4070
	CN0103	B TO B CONNECTOR	VKN2011
	CN0102	14P FFC CONNECTOR	VKN2040

D FRJB ASSY

SEMICONDUCTORS

	D0301-D0303		UMZ6R8N

CAPACITORS

	C0306, C0308		CCSRCH471J50

OTHERS

	JA0301	4P MINIDIN SOCKET(S)	AKP1238
	JA0302	3P PIN JACK	VKB1208
	CN0301	30P FFC CONNECTOR	HLEM30S-1
	CN0302	18P FFC CONNECTOR	VKN1249
	KN0301, KN0302	WRAPPING TERMINAL	VNF1084

E FLKY ASSY

SEMICONDUCTORS

	IC0101		PT6315
	IC0102		RPM7140-H9
	Q0112		2SA1576A
	Q0113		2SC4081
	Q0111		2SC5712
	Q0101, Q0102, Q0104-Q0107		DTC124EUA
	D0101		SLR-343BBT
	D0122		1SS355
	D0124, D0125		RF101L2S
	D0103		SLR-343DC
	D0105, D0107, D0109, D0111, D0115		SLR-343VC
	D0117, D0119		SLR-343VC
	D0123		UDZS13(B)
	D0121		UDZS15(B)
	D0126		UDZS2R4(B)

TRANSFORMERS

	T0101		VTT1171

COILS AND FILTERS

	L0102		LAU220J

SWITCHES AND RELAYS

	S0101-S0113		VSG1024

CAPACITORS

	C0137		CEAL100M50
	C0105		CEAL101M10
	C0135		CEAL101M16
	C0131		CEJQ101M16
	C0118, C0119, C0134		CKSRYB103K50
	C0133		CKSRYB223K50
	C0101, C0102, C0106-C0108, C0110		CKSRYF104Z25
	C0116, C0121-C0130, C0132, C0212		CKSRYF104Z25
	C0112		CKSRYF104Z50

RESISTORS

	R0128		RS1/10S0R0J
	R0129, R0130, R0211, R0212		RS1/10S182J
	R0161		RS1/10S221J
	Other Resistors		RS1/16S###J

OTHERS

	CN0102	KR CONNECTOR	B4B-PH-K-S
	V0101	FLUORESCENT TUBE	VAW1091
	CN0101	18P FFC CONNECTOR	VKN1278
		FL HOLDER	VNF1134

F PWSB ASSY

SEMICONDUCTORS

	Q0211		DTC124EUA
	D0211		SLR-343BBT

SWITCHES AND RELAYS

	S0211		VSG1024

OTHERS

	CN0211	KR CONNECTOR	B4B-PH-K-S

G MAIN ASSY

SEMICONDUCTORS

	IC3101		AK5359ET
	IC5631		BD6517F
	IC0501		BD7997FS
	IC2401, IC2402		CEK1285
	IC1201, IC1221		K4H511638C-UCB3
	IC2202		MM1501XN
	IC2201		MM1503XN
⚠	IC5621		MM1565AF
	IC1301		NJM12904V
	IC3201		PCM1742KE
	IC6001		PDC147A8
	IC3707		PST3813U
⚠	IC4512		S-1170B25UC-OTK
⚠	IC4507, IC4511		S-1170B33UC-OTS
⚠	IC4504		S-1170B50UC-OUJ
	IC3103, IC6003		TC74VHC157FTS1
	IC6091, IC6092		TC7PA53FU
	IC3501		TC7SH08FUS1
	IC3102		TC7SZ126FU
	IC6002		TC7WH08FU
	IC6004		TC7WH241FU
	IC5701		TDOTG242-0F0C8
	IC0101		UPC3345GC-YEB-A
	IC3202		UPC4570G2-A
	IC1001		UPD61272F1-107KA3A
	IC1102		VYW2390
	Q1801, Q1811, Q2205, Q2206		2SA1576A
	Q2501-Q2505		2SA1576A
	Q3501, Q4561		2SC4081
	Q0101		RT1N141U
	Q5701		UMD2N

Mark No.	Description	Part No.
D3201		DAN202U
D3711, D3712		RB501V-40
D0101		SML-310YT

COILS AND FILTERS

L0106, L0107, L0112, L1010	BTH1103
L1001, L1003, L1004, L1006-L1008	DTL1106
L1201, L3102, L5701	DTL1106
L1811	LCYA150J2520
L1801	LCYA390J2520

CAPACITORS

C1001	ACH7195
C1081	CCSSCH100D50
C0158-C0162, C1813, C6008	CCSSCH101J50
C3207, C3211	CCSSCH121J50
C1902, C1911	CCSSCH150J50
C1812	CCSSCH151J50
C1901, C1912	CCSSCH180J50
C1803	CCSSCH221J50
C0169, C0171, C0509	CCSSCH390J50
C3501, C3808-C3810	CCSSCH470J50
C1084-C1087	CCSSCH5R0C50
C0510	CCSSCH620J50
C0264	CCSSCH680J50
C5721, C5722	CCSSCK2R0C50
C3212	CEAT102M6R3
C1708, C4507	CEVW100M16
C2506, C3106, C3214, C3216, C4542	CEVW101M16
C4563, C5624	CEVW101M16
C1003, C1005, C1014, C1020, C1071	CEVW221M4
C1074, C1235, C5701	CEVW221M4
C0511	CKSQYB105K16
C5623	CKSQYB225K10
C0105, C0121-C0123, C0125, C0133	CKSQYB475K6R3
C0135, C0152, C0153, C0155, C0165	CKSQYB475K6R3
C0168, C0178, C0181, C0184, C1073	CKSQYB475K6R3
C1076, C4508, C4525, C4526	CKSQYB475K6R3
C4548, C4549, C4552, C5725	CKSQYB475K6R3
C0157, C2221, C2222, C4551	CKSRYB105K10
C0109, C0111	CKSRYB334K10
C0101, C0102, C0136	CKSRYB474K10
C0296, C1009, C1015, C1018, C1021	CKSRYF105Z10
C1024, C1044, C1047, C1052, C1055	CKSRYF105Z10
C1061, C1062, C1065, C1070, C1113	CKSRYF105Z10
C1202, C1204, C1208, C1221, C1223	CKSRYF105Z10
C1227, C1421, C1801, C1811	CKSRYF105Z10
C2208, C2209, C2501, C3102, C3103	CKSRYF105Z10
C3107, C3502, C3511, C3738	CKSRYF105Z10
C3801-C3803, C3805, C5621, C5702	CKSRYF105Z10
C5711-C5720, C6009, C6011, C6013	CKSRYF105Z10
C6071, C6091, C6092	CKSRYF105Z10
C0151, C0189, C0261, C1010, C1016	CKSSYB102K50
C1019, C1022, C1025, C1046, C1049	CKSSYB102K50
C1054, C1057, C1059, C1064	CKSSYB102K50
C1067, C1068, C1207, C1209, C1210	CKSSYB102K50
C1226, C1228, C1229, C4527, C4550	CKSSYB102K50
C5506, C5622	CKSSYB102K50
C0119, C0129, C0130, C0142, C0164	CKSSYB103K16
C0187, C0188, C0221, C1205, C1206	CKSSYB103K16
C1224, C1225, C1709, C2223, C2224	CKSSYB103K16
C3701, C4509	CKSSYB103K16
C0103, C0104, C0112, C0117, C0124	CKSSYB104K10
C0126-C0128, C0132, C0143, C0144	CKSSYB104K10
C0150, C0156, C0163, C0167, C0172	CKSSYB104K10
C0175, C0260, C0504, C0505, C1026	CKSSYB104K10
C1029, C1034, C1037, C1040, C1043	CKSSYB104K10
C2301, C2302, C3806, C3815, C3816	CKSSYB104K10
C0137	CKSSYB182K50
C0145, C0146	CKSSYB222K50
C0224, C0230, C0231	CKSSYB223K16
C0108, C0110, C0139, C0141, C1802	CKSSYB331K50
C3204	CKSSYB331K50
C0114	CKSSYB332K50
C0116	CKSSYB333K10
C0232, C0233	CKSSYB471K50
C0148, C0220, C0223	CKSSYB472K25
C0147, C0532, C1804, C1814	CKSSYB473K10
C0297, C3208, C3210	CKSSYB681K50
C0138	CKSSYB682K25
C0154, C0236	CKSSYB683K10
C0115	CKSSYB822K16
C0501, C0503, C1002, C1004, C1007	CKSSYF104Z16
C1045, C1048, C1050, C1051, C1053	CKSSYF104Z16
C1056, C1058, C1060, C1063, C1066	CKSSYF104Z16
C1069, C1082, C1105, C1203	CKSSYF104Z16
C1211-C1214, C1222, C1230	CKSSYF104Z16
C1302, C1303, C1312, C1313	CKSSYF104Z16
C1701-C1707, C2401-C2406, C3101	CKSSYF104Z16
C3108, C3201-C3203, C3206, C3209	CKSSYF104Z16
C4561, C4562, C4565, C5512	CKSSYF104Z16
C6003-C6005, C6007, C6012	CKSSYF104Z16
C0113	DCG1040
C0502	DCH1165
C0107, C0118, C1008, C1017, C1075	DCH1201
C2210, C2217, C5727-C5729	DCH1201
C4554, C4555	VCG1058
C1215	VCH1246

RESISTORS

R0501	DCN1160
R0502	DCN1162
R3854, R6039, R6040	RAB4CQ0R0J
R0240, R1411, R3102	RAB4CQ103J
R3801-R3806	RAB4CQ223J
R1245, R1246, R1255, R1256	RAB4CQ330J
R1265, R1266, R1273, R1274	RAB4CQ330J
R3810-R3813, R3824	RAB4CQ330J
R0254	RAB4CQ473J
R1241, R1242, R1248, R1249	RAB4CQ560J
R1261, R1262, R1268, R1269	RAB4CQ560J
R1281-R1283, R1287	RAB4CQ560J
R3208, R3223	RN1/16SC56R0D
R3207, R3226	RN1/16SE1502D
R3209, R3224	RN1/16SE8201D
R0133, R1001, R1002, R2401	RS1/10S0R0J
R4513, R4514, R4517, R4520-R4524	RS1/10S0R0J
R4527, R4591-R4593, R5702	RS1/10S0R0J
R1302, R1303, R1312, R1313	RS1/16S1001F
R5716	RS1/16S1501F
R2502, R2505, R2508, R2511, R2514	RS1/16S2000F

Mark No.	Description	Part No.
R1301		RS1/16S4700F
R0181		RS1/16S4701F
R1052		RS1/16S6200F
R3505		RS1/16S75R0F
R1054		RS1/16S9100F
R0510, R0511		RS1/4SA2R0J
Other Resistors		RS1/16S###J

OTHERS

X1001 (24.576MHz)		VSS1192
X1002 (27MHz)		VSS1191
X5701 (6MHz)		VSS1210
X6001 (12MHz)		VSS1216
X0201 (16.93MHz)		DSS1152
CN0502	4P FFC CONNECTOR	DKN1288
CN0501	FFC CONNECTOR	DKN1312
CN0601	5P FFC CONNECTOR	DKN1402
CN0101	50P FFC CONNECTOR	DKN1404
CN1402	7P FFC CONNECTOR	RKN1048
CN5601	CONNECTOR POST	S10B-PH-K-S
CN2401	KR CONNECTOR	S13B-PH-K-S
CN6002	9P FFC CONNECTOR	VKN1413
CN2301	35P FFC CONNECTOR	VKN1439
CN0401	10P FFC CONNECTOR	VKN2029
CN1401	14P FFC CONNECTOR	VKN2030
CN2601	14P FFC CONECTOR	VKN2040
CN3802	24P FFC CONNECTOR	VKN2045
CN3801, CN6001	40P FFC CONNECTOR	VKN2050

H HDMIB ASSY

SEMICONDUCTORS

IC0101		CD0041AF
IC0102		HY57V161610FTP-7
⚠ IC0301		NJM2880U1-05
⚠ IC0302		S-1170B18UC-OTD
⚠ IC0303		S-1170B33UC-OTS
IC0201		SII9030CTU
IC0202		TC74LCX08FTS1
IC0103		TC74LCX573FTS1
IC0104		TC7SH04FUS1
Q0205		2SA1576A
Q0201		DTC124EUA
Q0204		HN1C01FU
Q0203		UM6K1N
Q0202		UMB1N
D0303, D0306		1SR154-400
D0307		RB161M-20
D0302		RB501V-40

COILS AND FILTERS

L0201-L0204	ATH7022
L0104	CTF1399

CAPACITORS

C0326, C0328	CEVW220M6R3
C0327, C0329	CEVW470M6R3
C0307, C0310	CKSQYB102K50
C0101, C0105, C0134, C0201, C0203	CKSQYB105K16
C0301, C0304, C0306, C0309, C0311	CKSQYB105K16
C0302	CKSQYB225K10
C0312	CKSQYB475K6R3
C0209, C0211	CKSRYB102K50
C0104	CKSRYB333K16
C0103	CKSRYB334K10
C0107-C0133, C0223, C0224	CKSRYF104Z16
C0135, C0136, C0144, C0205-C0208	CKSRYF105Z10
C0210, C0212-C0218, C0222, C0225	CKSRYF105Z10
C0303	CKSRYF105Z10
C0137-C0142	CKSSYF104Z16

RESISTORS

R0129, R0130	RAB4CQ0R0J
R0127, R0128	RAB4CQ101J
R0121-R0126	RAB4CQ470J
R0134, R0135, R0137, R0138	RAB4CQ680J
R0111-R0113, R0115, R0201-R0206	RS1/10S0R0J
R0210, R0213, R0246	RS1/10S0R0J
R0263	RS1/16SS4700F
Other Resistors	RS1/16S###J

OTHERS

JA0201	HDMI CONNECTOR	AKP7210
CN0101	40P FFC CONNECTOR	VKN1811

I DVJB ASSY

SEMICONDUCTORS

IC101	ADV7172KSTZ
IC103	HY57V161610ETP-8
IC105, IC107	NJU7013F
⚠ IC106	S-1170B25UC-OTK
IC104	TC7WHU04FU
IC108	UPD72852AGB-8EU-A
IC102	UPD72893BF1-FN3
Q101-Q104	2SA1576A
D101	HVC359
D102	HVC362

COILS AND FILTERS

F101	DTF1069
L106, L107	DTL1106
L101, L102	LCYA100J2520
L109, L111	LCYA150J2520
L108, L110	LCYA180J2520
L104, L105	VTH1043

CAPACITORS

C200, C218	CCSRCH100D50
C258	CCSRCH271J50
C211, C213	CCSRCH330J50
C212	CCSRCH5R0C50
C254, C255	CCSRCH8R0D50
C107, C112	CCSSCH330J50
C161-C163	CCSSCH470J50
C103, C108	CCSSCH680J50
C104, C109	CCSSCH7R0D50
C106, C111	CCSSCH820J50
C105, C110	CCSSCJ3R0C50
C144, C220, C223	CEVW221M4
C101, C102, C122, C126, C140	CKSQYF106Z10
C142, C147, C204, C207, C214	CKSQYF106Z10
C230, C233, C248, C252	CKSQYF106Z10
C222	CKSQYF475Z10
C201, C205	CKSRYB104K16

Mark	No.	Description	Part No.
	C203, C210, C245, C249, C250		CKSRYF104Z25
	C124, C127-C135, C141, C143		CKSRYF105Z10
	C146, C148-C160, C206, C215		CKSRYF105Z10
	C231, C240, C241, C243, C244		CKSRYF105Z10
	C246, C247, C251, C253		CKSRYF105Z10
	C256, C257		CKSRYF105Z10
	C216		CKSRYF473Z25
	C145, C235		CKSSYB103K16
	C113-C117, C123, C125, C136		CKSSYF104Z16
	C232, C234, C237, C242		CKSSYF104Z16
	C259-C261		CKSSYF104Z16

RESISTORS

R144-R149, R155-R158		RAB4CQ103J
R169-R172, R185-R188		RAB4CQ103J
R150, R151		RAB4CQ470J
R248		RN1/16SE9101D
R141, R197, R198, R211, R215		RS1/10S0R0J
R105, R111		RS1/16S1500F
R268		RS1/16S5101F
R264-R267		RS1/16S56R0D
R135		RS1/16S6800F
Other Resistors		RS1/16S###J

OTHERS

JA101	1394-TERMINAL	VKN2028
CN101	CONNECTOR	VKN2045
X102	CRYSTAL RESONATOR	VSS1184
X101	VCXO	VSS1195

J USBB ASSY

COILS AND FILTERS

L105, L106	VTH1054
L101-L104	VTL1169

CAPACITORS

C102	CEVW221M6R3
C101	CKSRYF104Z25

RESISTORS

Other Resistors	RS1/16S###J

OTHERS

CN101	CONNECTOR	B10B-PH-K
JA101	USB CONNECTOR	VKB1226
JA102	USB CONNECTOR	VKB1227

K ATAB ASSY

OTHERS

CN0012	40P ATA CONNECTOR	VKN1816
CN0011	40P CONNECTOR	VKN1818

L POWER SUPPLY UNIT

POWER SUPPLY UNIT has no service part.

6. ADJUSTMENT

[Purpose]

If the combination of MAIN Assy and LOADER Assy is changed, the adjusted value for LD power will be shifted, and stable playback or recording of a disc will become impossible. Therefore, when the combination of MAIN Assy and LOADER Assy is changed, LD power adjustment and adjustment for disc judgment will be necessary.
Be sure to do this adjustment at following cases.

- When replacing MAIN Assy
- When replacing LOADER Assy

[Tools to be used]

- Special tool for adjusting the LD power (GGF1559)
- 10-pin FFC flexible cable (GGD1477)
- CD-ROM test disc: CDT-313 (GGV1054)
- DVD dual-layer test disc: DVDT-002 (GGV1036)

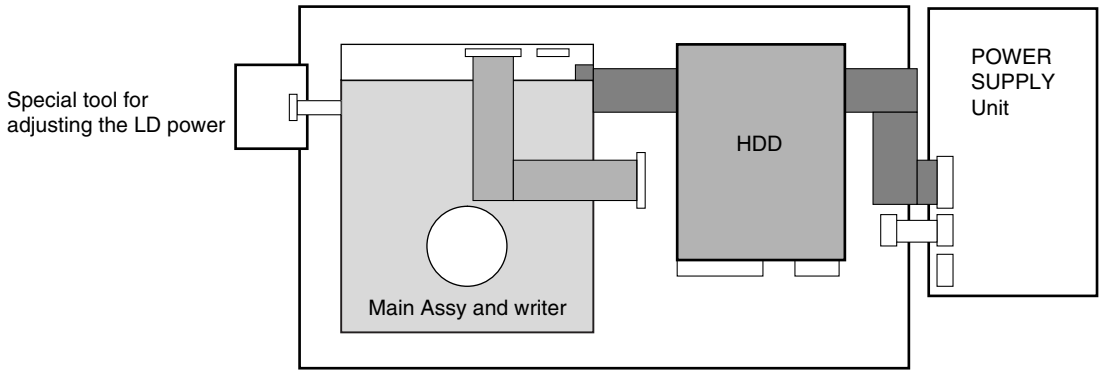
[Notes]

Never turn the power off while any of the following operations is in progress:

- While laser diode (LD) power adjustment is being performed normally by the unit
- While adjustment for disc judgment is being performed

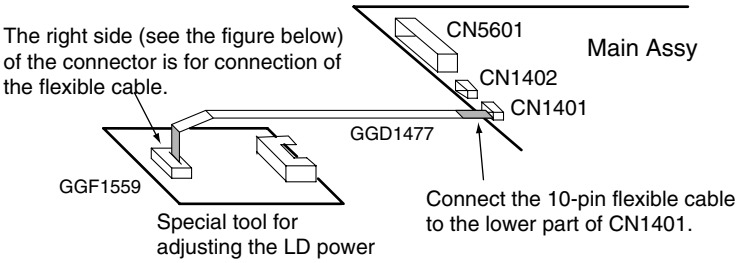
[Connections]

- Connections for adjusting the LD power

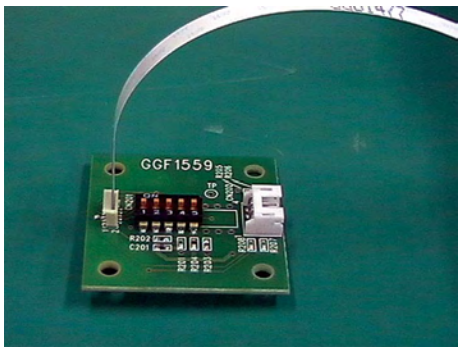


Note: Before adjusting the LD power, disconnect the power to the HDD and the flexible cable for ATA (40-pin).

- To which the special tool for adjusting the LD power is connected



- Setting of the switches on the special tool for adjusting the LD power



GGF1559

Set all five switches to ON.

[Procedures]

1. Connect the special tool for adjusting the LD power, as shown on the previous page.

2. Turn on the DVD recorder. ("POWER ON" will be indicated on the FL display.)

3. The tray opens.
   Make sure that powered opening of the tray is working.
   If the tray does not open under power:
   a. Flexible cables or other cables may not be connected. (Connection of cables to the HDD is not necessary.)
   b. Wrong setting of the switches on the special tool for adjusting the LD power, or failure in the special tool or the 10-pin flexible cable, is suspected.
   c. Failure in the loader, MAIN Assy, or POWER SUPPLY Unit is suspected.

   Make sure that the LED next to CN401 is lit.
   If the LED flashes:
   a. Wrong setting of the switches on the special tool for adjusting the LD power, or failure in the special tool or the 10-pin flexible cable, is suspected.

4. Manually close the tray. Adjust the LD power.
   Make sure that the LED next to CN401 is lit.
   If the LED flashes three or four times in a burst:
   a. The PU flexible cable may not be connected.
   b. Failure in the Traverse Mechanism or MAIN Assy is suspected.

5. After adjusting the LD power, invoke powered opening of the tray. *(LD power adjusting time : about 60 sec.)*
   Make sure that the LED next to CN401 flashes once per burst.

6. Load the DVDT-002 on the tray.
   The tray automatically closes after 15 seconds.
   The tray repeatedly closes and opens automatically until a disc is loaded.

7. After adjustment for judging the DVD disc, the tray automatically opens.
   Make sure that the LED next to CN401 flashes twice in a burst. *(DVD disc discrimination adjusting time : about 25 sec.)*
   If the LED flashes only once per burst:
   a. A disc other than the DVDT-002 may be loaded. Be sure to load the DVDT-002.

8. Replace the DVDT-002 with the CDT-313.
   The tray automatically closes after 15 seconds.
   The tray repeatedly closes and opens automatically until a disc is loaded.

9. After adjustment for judging the CD disc, the tray automatically opens.
   Make sure that the LED next to CN401 is unlit. *(CD disc discrimination adjusting time : about 25 sec.)*
   If the LED flashes twice in a burst:
   a. A disc other than the CDT-313 may be loaded. Be sure to load the CDT-313.

10. Unload the CDT-313 and manually close the tray.

11. Turn off the recorder by holding the POWER button pressed for several seconds.

12. Disconnect the 10-pin FFC cable from the MAIN Assy.

13. Set the power sources for the HDD and the flexible connecting cable for ATA (40-pin) to their original statuses.

[Points to be confirmed]

1. Make sure that real-time recording on a DVD-R/-RW/RAM will finish normally.
2. Play back a recorded disc and make sure that playback is performed without a problem.

7. GENERAL INFORMATION

7.1 DIAGNOSIS

◆ Jigs and Tools to be used

Remote control unit for servicing (GGF1381) DVD Recorder Data Disc (Type 2)(*) Download disc Test disc (GGV1025) DVD-RW (Commercial goods)	(*) Be sure to use the latest disc (Type 2). In April, 2006, the latest disc is GGV1238.

◆ Service Mode List

1. Setting type

Item	When to perform
7.1.1 Model setting	• When replacing MAIN ASSY or JACB ASSY
7.1.2 CPRM ID number and data	• When "CPRM ERROR" is displayed on the display screen • After the MAIN ASSY or HDD replaced.
7.1.3 Firmware downloading method	• After model setting (After replacing MAIN ASSY, JACB ASSY) • After the HDD is replaced. • When NG is displayed for the version infomation in Service mode
7.1.4 Video Adjustment for Specific Area	• When a flicker appears on the tuner display like a horizontal or vertial out-of-sync symptom
7.1.5 (4) OSD Filter Setting	• When a character flicker appears on the OSD depending on the monitor

2. Diagnosis type

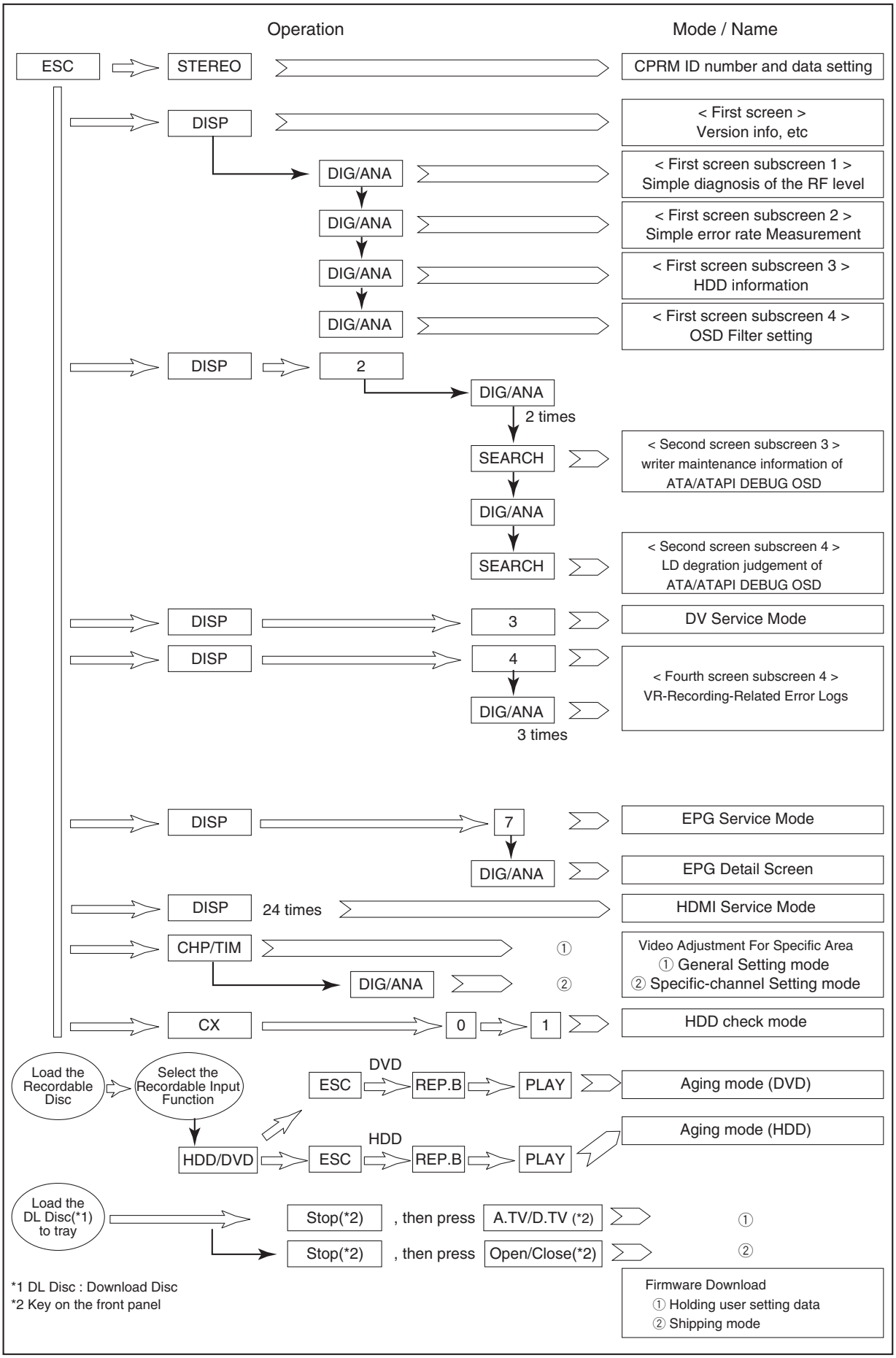
7.1.5 Service Mode First screen : Version, Simple diagnosis of the RF level, Simple error rate measurement, HDD information. Second screen : ATA/ATAPI debug screen, LD degration judgement Fourth screen : VR-recording-related error loss	• When confirming version infomation • When confirming the state of LOADER Assy
7.1.6 DV Service Mode	When any failures occurs while a DV device connected
7.1.7 EPG Service Mode	When EPG data cannnot be or can be only partially obtained.
7.1.8 HDMI Service Mode	When any failures occurs while a HDMI device connected
7.1.9 Aging Mode	When a claimed sympton is difficult to reproduce
7.1.10 HDD Check Mode	When checking the quality of HDD

◆ Necessary procedure List when replacing Assys

Following is the surely necessary procedures and the product state after changing, when replacing next ASSYs.

Replaced ASSY	Necessary setting	State after replacing	
		User setting	HDD contents
MAIN ASSY	1. Model setting 2. LD power adjustment 3. CPRM setting 4. Firmware update	×	○
JACB ASSY	1. Model setting 2. CPRM setting 3. Firmware update	×	○
LOADER ASSY	1. LD power adjustment	○	○
HDD	1. CPRM setting	○	×

◆SERVICE MODE MAP



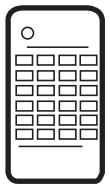
7.1.1 MODEL SETTING

[Purposes]

When the MAIN Assy and/or TUJB Assy that are(is) commonly used with another model are(is) replaced, they(it) must recognize the model of this unit.

Items to be set: The model number, destination, and region No. must be set.

[Tool to be used]



Remote control unit for servicing
(GGF1381)

[Notes]

- Once the setting has been made, it can never be changed. Be sure to make the setting correctly.
- As this setting resets the Assy(s) in question to the factory-preset status, it is recommended that you obtain the customer's consent beforehand.

[Procedures]

① After power on, the following screen is displayed on TV monitor. Press four digits properly (for example " 0832 ") by using the remote control unit for service, according to the screen information.

```
[Recorder's Model Setting]
 Input the number using the remote for Service.

> - - -

  Input No.     Model
   [ 0832  :  DVR-545HX/WY ]
   [ 0932  :  DVR-940HX/WY ]
   [ 0833  :  DVR-545HX/WV ]
   [ 0933  :  DVR-940HX/WV ]
   [ 0834  :  DVR-545HX/WYRE ]
   [ 0934  :  DVR-940HX/WYRE ]
```

② Disconnect then reconnect the AC power cord of the unit. Be careful not to impart vibration to the unit immediately after the AC power cord is disconnected.

③ Reset the recorder to all its factory settings.
(Make sure that the recorder is on. Press and hold ■ (STOP) key and press ⏻ (STANDBY/ON) key on the front panel.)
The recorder turns off with all settings reset.

④ Press [ESC] then [DISP] keys by using the remote control unit for servicing, and then confirm each Model Name (for example " DVR-545HX/WY ").

```
DVR-545HX/WY        VERSION : 2.**
  SYSCON    : RELEASE_424
              Rev     :1.13877. 4. 63
TUNERCON    : 483. 079                    OK
    DRIVE   : DVD-RW DVR-L11X             OK
              1.05                        OK

     HDD    : WDC WD1600BB-xxGUCx    160

    TBCON   : 119. 000                    OK

   DEVICE   : E2R-FE  1.2     FLASH  : 64M
  REGION    : 2                C : **********
  DTB  H : 420                 DTB  S :150e   OK
```

⑤ End

7.1.2 CPRM ID NUMBER AND DATA SETTING

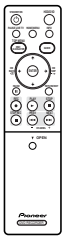
[Purposes]

For the DVD recorder,it is necessary with the recoding/playback of DVD–RW disc to set an individual number (ID number) and ID data to each recorder. If the number and data are not set correctly with the following procedure, cannot work with residual quantity 0:00 or operations in the future may not be guaranteed with RW disc. You will find the ID number to be set on the ID label on the rear panel.

The Input is Necessary When:

- " CPRM ERR" is displayed on the FL display immediately after the power is turned on or in Stop mode.
- When the MAIN ASSY or the HDD is exchanged.

[Tools to be used]



Remote control unit supplied with the unit (VXX3092)

Remote control unit for servicing (GGF1381)

DVD Recorder Data Disc (Type 2)

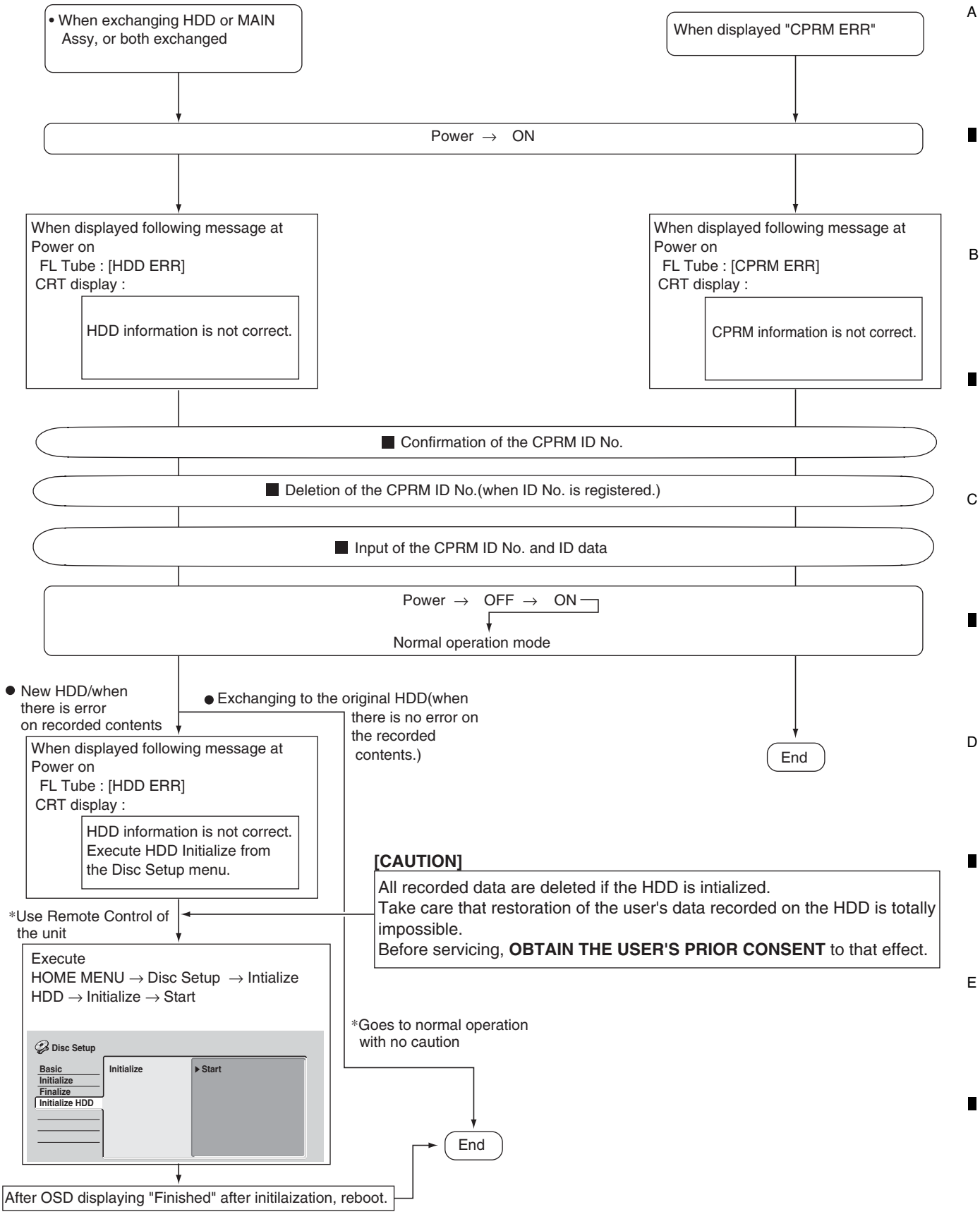
Be sure to use the latest disc (Type 2).
In May, 2006, the latest disc is GGV1273.

[Notes]

Important: If no ID label is found on the rear panel, write down the specified ID number by checking it according to "How to confirm the ID number" shown below.

- Input the ID number while the unit is in Stop mode.
- After the data are read from the data disc (Type 2), the disc will automatically be unloaded.

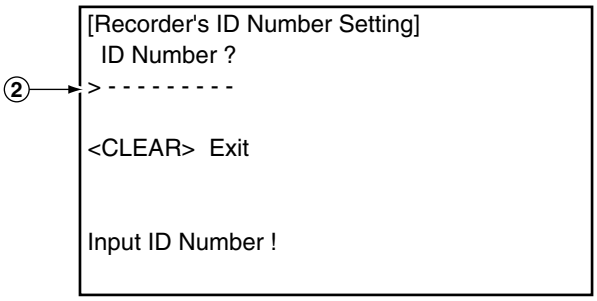
■ Input Flow of the ID No. and ID data when exchanging HDD or MAIN Assy


• When exchanging HDD or MAIN Assy, or both exchanged
When displayed "CPRM ERR"
Power → ON
When displayed following message at Power on
FL Tube : [HDD ERR]
CRT display :
HDD information is not correct.
When displayed following message at Power on
FL Tube : [CPRM ERR]
CRT display :
CPRM information is not correct.
■ Confirmation of the CPRM ID No.
■ Deletion of the CPRM ID No.(when ID No. is registered.)
■ Input of the CPRM ID No. and ID data
Power → OFF → ON
Normal operation mode
● New HDD/when there is error on recorded contents
● Exchanging to the original HDD(when there is no error on the recorded contents.)
End
When displayed following message at Power on
FL Tube : [HDD ERR]
CRT display :
HDD information is not correct.
Execute HDD Initialize from the Disc Setup menu.
[CAUTION]
All recorded data are deleted if the HDD is intialized.
Take care that restoration of the user's data recorded on the HDD is totally impossible.
Before servicing, OBTAIN THE USER'S PRIOR CONSENT to that effect.
*Use Remote Control of the unit
Execute
HOME MENU → Disc Setup → Intialize
HDD → Initialize → Start
*Goes to normal operation with no caution
Disc Setup
Basic
Initialize
Finalize
Initialize HDD
Initialize
Start
End
After OSD displaying "Finished" after initilaization, reboot.

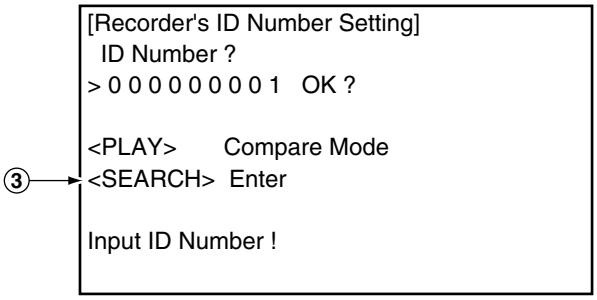
How to Input the ID Number and ID Data

① To enter the input mode, press ESC + STEREO keys sequentially in a status with no ID number set, such as after FLASH-ROM downloading.

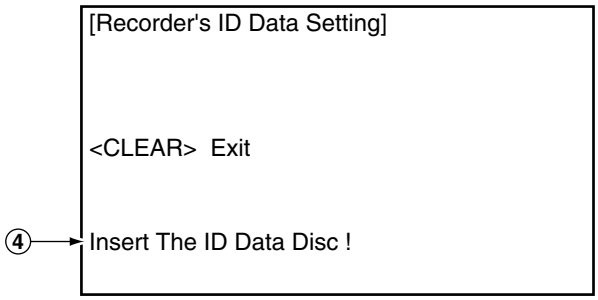
② As number input is enabled when the unit enters the input mode, input the 9-digit ID number.
(The entered number is also displayed on the FL display.)



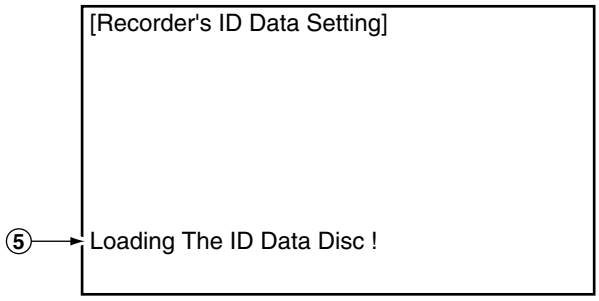
③ After inputting the number, press SEARCH keys to register the ID number.



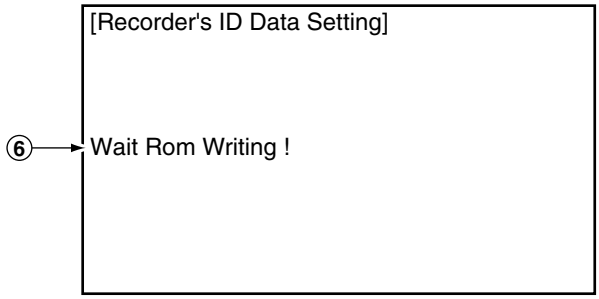
④ When the ID number has been registered, the unit enters the ID data input mode. (The FL display indicates "INSERT ID.")
In this condition, place the ID data disc on the tray and close the tray using the CLOSE key "■/⏏" on the player.



⑤ While the data are being read, the message shown in the figure at left is displayed on the screen.
(The FL display indicates "LOAD ID.")

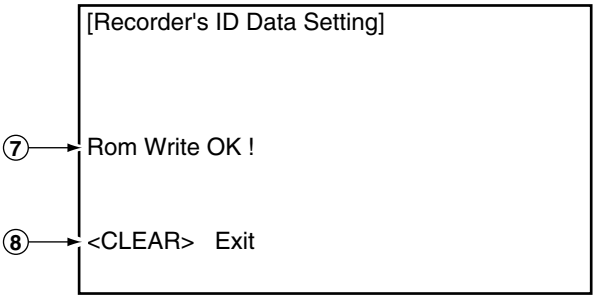


⑥ When the ID data have been read, the data are written to the FLASH-ROM.
(The FL display indicates "WRITE ID.")



⑦ When the ID data have been written to the FLASH-ROM, the message "Rom Write OK" is displayed on the screen.
(The FL display indicates "ID OK.")

⑧ After confirming this message, press CLEAR key to exit the input mode.

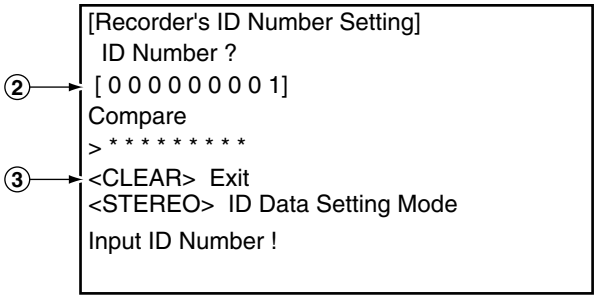


[How to Confirm the ID Number]

① Press ESC + STEREO keys sequentially with an ID number already set, and the unit enters the ID number confirmation mode.

② The set ID number is displayed on the screen (and on the FL display), permitting you to confirm it.

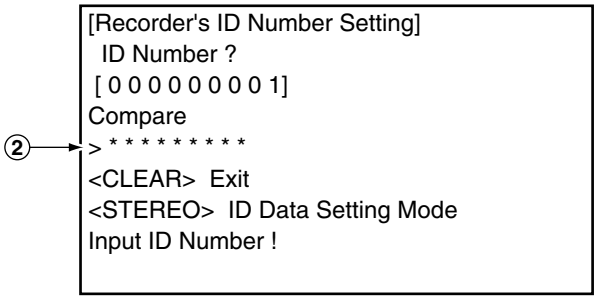
③ To exit this mode, press CLEAR key.



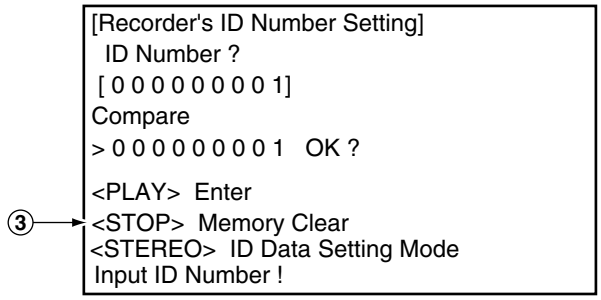
[How to Clear the ID Number]

① Press ESC + STEREO keys sequentially with an ID number already set, and the unit enters the ID number confirmation mode.

② Input the same number as the ID number you have set.



③ After inputting the number, press STOP key.
Only when the entered number matches the set ID number, the ID number is cleared and the unit exits this mode.
If the numbers do not match, you must return to step ②.
(STOP key is not accepted until 9 digits are entered.)



7.1.3 FIRMWARE DOWNLOADING METHOD

[Purposes]

1. When the main board is replaced, the firmware versions for the system control computer, drive, and the TUFL microcomputer do not match, and operations of the unit may be destabilized.
   To match the versions for the above four, firmware downloading is necessary in the following two cases:
   ① After the model setting
   ② When NG is displayed on the first screen (version information, etc.) of Service mode
   ③ After changing MAIN Assy or TUJB Assy

2. Rewriting the firmware to the latest version may ameliorate the symptoms claimed by the customer.

There are the following two methods for downloading: disc download and serial download

1. DISC DOWNLOAD

[Tools to be used]

Remote control unit for servicing (GGF1381)

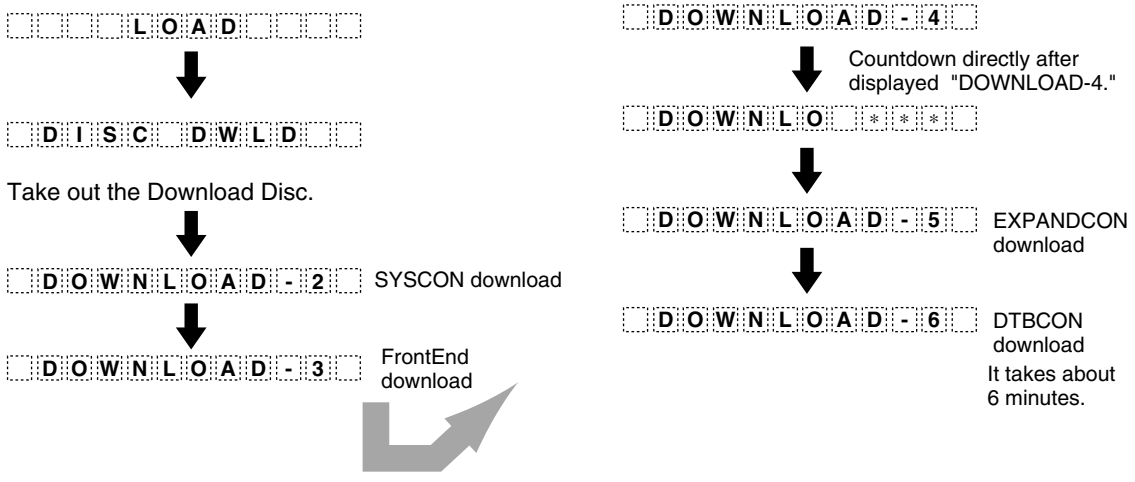
Download DISC

[Notes]

Be sure NOT to turn off the unit during downloading.
If the unit is turned off during downloading, the SYSCON, TUNERCON, DRIVE and IR Blaster programs may not be properly rewritten, in which case the unit may not be able to initialize itself normally when turned on again.

[Procedure] ① Open a disc tray by pressing the "OPEN/CLOSE" button.
② Put the download disc on the tray. Press a " A.TV/D.TV " button while pressing a "Stop" button on the frontpanel.
* The disc tray closes automatically and the disc is loaded.
* The disc tray opens automatically after loading.

FL display



* After download is completed, the power turns off, and turns on and a disc tray closes automatically.
* It takes for about 7-8 minutes until download is completed.

④ Press and hold a " ESC " button, then press " DISP " button on the remote control unit for servicing.
⑤ Confirm a firmware release version.
⑥ Press " ESC " button on the remote control unit for servicing in order to exit the test mode.

[Tips]

(1) If the power is not correctly turned on or when the power is shut off during downloading, proceed as follows before performing download again:

- In a case where downloading was incorrectly terminated while "DOWNLOAD-2" was displayed on the FL display:
  The SYSCON program will not function correctly.
  If the program cannot be downloaded from the disc or through serial communication, replace the MAIN ASSY.

- In a case where downloading was incorrectly terminated while "DOWNLOAD-3" was displayed on the FL display:
  The DRIVE program will not function correctly.
  If the program cannot be downloaded from the disc or through serial communication, replace the MAIN Assy.

- In a case where downloading was incorrectly terminated while "DOWNLOAD-4" was displayed on the FL display
  The program for the tuner microcomputer will not function correctly.
  If the program cannot be downloaded from the disc, replace the TUNERCON microcomputer (IC101 : JACB ASSY).

- In a case where downloading was incorrectly terminated while "DOWNLOAD-5" was displayed on the FL display
  The program for the EXPANDCON microcomputer will not function correctly.
  If the program cannot be downloaded from the disc, replace the EXPANDCON microcomputer (IC6001 : MAIN ASSY).

- In a case where downloading was incorrectly terminated while "DOWNLOAD-6" was displayed on the FL display
  The program for the IDTB microcomputer will not function correctly.
  If the program cannot be downloaded from the disc, replace the DTB microcomputer (IC106 : DTBR ASSY).

(2) The setting way to shipping mode (Reference)
At ② lines of the [Procedures], press "OPEN/CLOSE" button while pressing REC STOP button.

2. SERIAL DOWNLOAD

[Purposes]

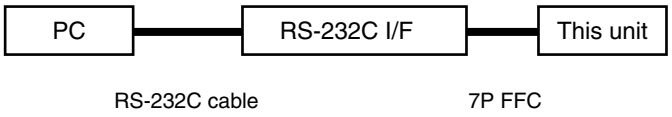
1. When the main board is replaced, the firmware versions for the system control computer, drive, and the TUFL microcomputer do not match, and operations of the unit may be destabilized. In such a case, the versions for the above three must be matched.
2. This method is used when disc downloading fails.

[Tools to be used]

* PC with serial port
* RS-232C straight cable
* RS-232C I/F jig (GGF1348)
* 7P FFC (VDA1681)
* Download program (UFU.exe)
* Firmware

[Connection]

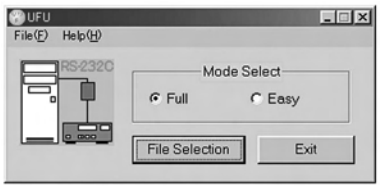
Connect as follows:



[Procedures]

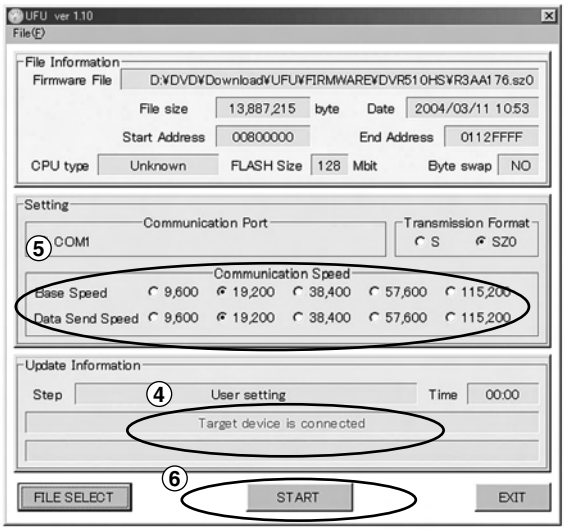
① Connect the 232C I/F jigs above way.

② Turn on the PC and start the " UFU.exe ".



③ Select the Firmware file. ("sz0" file)

④ Turn the DVD recorder on and start the download program.
" Target Device is connected " is appeared on the screen.



⑤ Select the Communication Speed (Baud Rate)
a) Base Speed 115,200
b) Data Send Speed 115,200

⑥ START
- Even if you click "START" button, sometimes "Communication Error" may come out one to twice, and download may fail.
  In this case, please click "START" again.
- Other factors can be considerd if download fails 3 times or more.
- And it takes about 20 minutes for updating the firmware.

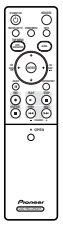
* TUNERCON, EXPANDCON and DTBCON program is not downloaded this way, so do disc-download for TUNERCON, EXPANDCON and DTBCON.

7.1.4 VIDEO ADJUSTMENT FOR SPECIFIC AREA

[Purposes]

Depending on the area, if a flicker may appear in a picture received by the tuner, it can be corrected or reduced with this setting.

[Tools to be used]



Remote control unit supplied with the unit (VXX3092)

Remote control unit for servicing (GGF1381)

1. Specific-Channel Setting mode

In this mode, specific settings can be made for up to 12 channels.
For channels that do not have specific settings, the settings of General Setting mode are applied.

[How to enter this mode]

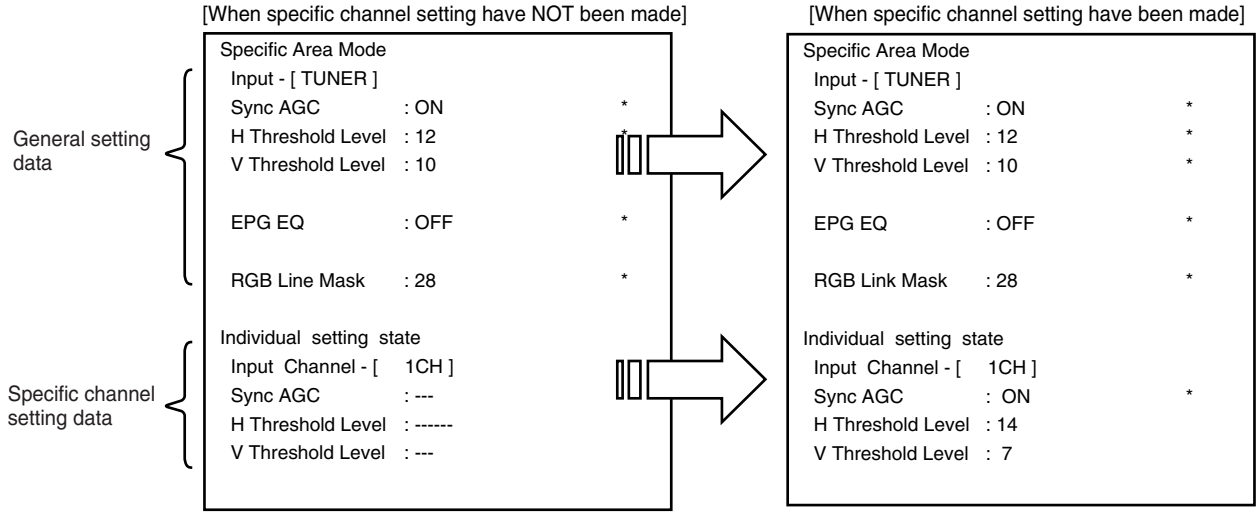
① Select a channel or line input (L1-L3) on which a specific setting is to be made.
② Press the ESC then CHP/TIM keys on the remote control unit for servicing. "General Setting mode" is displayed.
③ Press the DIG/ANA key in General Setting mode. Specific-Channel Setting mode is entered.

[How to exit] Press the ESC key on the remote control unit for servicing to return the Normal mode.

[Note] Setting is in effect only during recording/playback stop.

[Setting examples]

The setting examples in Specific-Channel Setting mode are shown below.
For details on each setting item, see "Table 1: Key operations in Specific-Area Setting mode."


[When specific channel setting have NOT been made]
[When specific channel setting have been made]
General setting data
Specific channel setting data
Specific Area Mode
Input - [TUNER]
Sync AGC : ON *
H Threshold Level : 12
V Threshold Level : 10
EPG EQ : OFF *
RGB Line Mask : 28 *
Individual setting state
Input Channel - [1CH]
Sync AGC : ---
H Threshold Level : ------
V Threshold Level : ---
Specific Area Mode
Input - [TUNER]
Sync AGC : ON *
H Threshold Level : 12 *
V Threshold Level : 10 *
EPG EQ : OFF *
RGB Link Mask : 28 *
Individual setting state
Input Channel - [1CH]
Sync AGC : ON *
H Threshold Level : 14
V Threshold Level : 7

[Tips]

- If a channel that does not have specific settings is displayed, the setting figures are displayed as hyphens (- -).
- If the setting figures are not displayed as hyphens, those settings have been specifically set even if they are identical to the default settings or those of General Setting mode.
- The setting indicated with an asterisk (*) is the default.
- The channels to be indicated for "Input Channel" are as shown below:
  Line inputs: L1-L3, DV (DV is not valid for specific-area settings.)
  Tuner channels: Channels received by the tuner (channels to be set in Specific-Channel Setting mode, etc.)

[Tips]

- Indication when the maximum number (12) of channels have individual settings
  If a channel that does not have specific settings is currently selected, the indication will be as shown below, and individual data items cannot be set for that channel. To set individual data items for the currently selected channel, you must clear any specific-channel settings for one or more channels.

```
Specific Area Mode
  Input - [ TUNER ]
  Sync AGC          : ON          *
  H Threshold Level : 12          *
  V Threshold Level : 10          *

  EPG EQ            : OFF         *

  RGB Line Mask     : 28          *

Individual  setting  state
  Sorry !
  You can store only 12 channels
  for Specific Area mode.
```

[H Threshold Level]
The slice level setting for the horizontal(H)-sync separation circuit can be changed. By your changing the slice level, horizontal sync disturbance may be ameliorated. Set the slice level to a value with which the least sync disturbance is seen.

[V Threshold Level]
The slice level setting for the vertical(V)-sync separation circuit can be changed. By your changing the slice level, vertical sync disturbance may be ameliorated. Set the slice level to a value with which the least sync disturbance is seen.

[Receiver sensitivity setting for an electronic program guide (EPG)]
The sensitivity when receiving an electronic program guide can be selected. Set the sensitivity to "High" only if reception is unstable.

2. General Setting mode

[How to enter this mode]

- To shift from Specific-Channel Setting mode:
  Each time the DIG/ANA key is pressed, Specific-Channel Setting mode and General Setting mode are alternately selected.

- To shift from Normal mode (recording/playback stop):
  Press the ESC then CHP/TIM keys.

[How to exit] Press the ESC key to return the normal mode.

[Setting examples]

Show setting example on the General Setting mode screen to the following.
Regarding setting of actual each item, refer to table 1 (key operations in specific-area setting mode).

[General Setting mode screen]

```
Specific Area Mode
  Input - [ TUNER ]
  Sync AGC          : ON          *
  H ThresholdLevel  : 12          *
  V Threshold Level : 10          *

  EPG EQ            : OFF         *

  RGB Line Mask     : 28          *
```

*: Setting is the default.

[Display in General Setting mode when the channel currently displayed has specific settings]

```
Specific Area Mode
  Input - [ TUNER ]
  Sync AGC          : ON          *
  H ThresholdLevel  : 12          *
  V Threshold Level : 10          *

  EPG EQ            : OFF         *

  RGB Line Mask     : 28          *

This channel is set up
  individually.
```

[Tips]

- General Setting mode can be entered only during recording/playback stop.
- The currently selected input mode (TUNER or LINE) is displayed for "Input."
- If L1, L2, L3, or DV is selected for input, general settings for the line input can be made (DV is not valid for specific-area settings), and if TUNER is selected, general settings for the tuner input can be made.

Table 1: key operations in specific-Area setting mode (1/2)
Key operations in Specific Area Setting mode of the remote control units are shown in the table below
(the keys are of the remote control unit for servicing unless otherwise stated):

Key	Operation	Switching (*: Default)	Remarks	Used in Specific-Channel Setting mode	Used in General Setting mode
[DIG/ANA]	Switches General setting mode and Specific setting mode.	–	–	○	○
[INPUT SELECT], [CHANNEL +/-] (Remote control unit supplied with this unit)	Switches inputs or channels.	–	–	○	○
[SIDE A], [SIDE B]	Sets SyncAGC.	ON(*) / OFF	ON : The sync level is set to an appropriate value. OFF : Cancel the Sync AGC.	○	○
[Rev ×3], [×3 Fwd]	Sets H Threshold.	0 – 15 (Default : 12)	[Rev ×3] : Decreasing 1 by 1 in the range 0 to 15. (Cyclic operation) [×3 Fwd] : Increasing 1 by 1 in the range 0 to 15. (Cyclic operation)	○	○
[Rev CHAPTER SKIP] [CHAPTER SKIP Fwd]	Sets V Threshold Level.	0 – 15 (Default : 10)	[Rev CHAPTER SKIP] : Decreasing 1 by 1 in the range 0 to 15. (Cyclic operation) [CHAPTER SKIP Fwd] : Increasing 1 by 1 in the range 0 to 15. (Cyclic operation)	○	○

Table 1: key operations in specific-Area setting mode (2/2)

Key	Operation	Switching (*: Default)	Remarks	Used in Specific-Channel Setting mode	Used in General Setting mode
[<<|| STILL STEP], [STILL STEP ||>>]	Sets Line Mask setting at RGB signal is inputted.	22 - 40 (Default: 28)	[<<|| STILL STEP] : Decreasing 1 by 1 in the range 22 to 40. (Cyclic operation) [STILL STEP ||>>] : Increasing 1 by 1 in the range 22 to 40. (Cyclic operation)	×	○
[PLAY]	All channels that have specific setting data will be canceled, and the specific data will be initialized.	–	The General Setting data will not be changed.	○	×
[CLEAR]	Specific-Channel Setting mode: If the currently selected channel has its specific setting, that setting will be canceled. (By canceling the specific setting for that channel, the number of remaining channels that can have specific settings will be increased by one.) General Setting mode: Settings of General Setting mode are initialized.	–	Specific-Channel Setting mode: All specific data are initialized. The General Setting data will not be changed. General Setting mode: All general setting data are reset to default. The specific setting data will not be changed (will be retained).	○	○
[PAUSE]	The specific-channel-setting data for the currently selected channel are reset to default.	–	The General Setting data will not be changed (will be retained).	○	×
[ESC]	To quit Setting mode for a specific area and clear the on-screen display.	–	–	○	○

Notes:
- Each key listed in Table 1 above is active only while the tuner is completely stopped.
- The setting values will not be reset to default even if resetting to the state at the time of shipment is performed.

7.1.5 SERVICE MODE

Overview and purposes

To be used to check the status of the product and to collect the information for failure diagnosis.
The following information to be used for servicing is displayed:
[1] First screen : Version, HDD information, etc.
[2] Second screen : ATA/ATAPI debug screen (Writer information)
[4] Fourth screen : VR-recording-related error logs

Each screen has sublevel screens.

[Note] After entering any Service mode screen, to shift to another Service mode screen, first quit that Service mode screen then enter another Service mode screen.

1. Version information, etc. (First screen)

[Purposes]

To check the versions of the system control computer, TUNER microcomputer, and firmware for the drive, simple measurement of the RF level for the U/V tuner, results of the simple error rate measuremen, HDD information, and OSD Filter setting

[Tools to be used]

Remote control unit for servicing (GGF1381)

Aluminum-coated test disc (GGV1025)

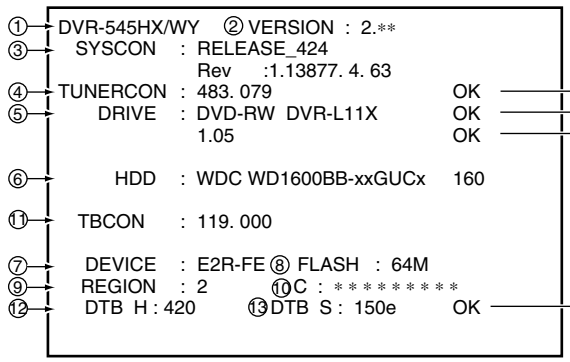
[How to enter] While the GUI screen is not displayed, press the ESC then DISP keys.

How to enter and change subscreens of the first screen: While the first screen is displayed, press the DIG/ANA key repeatedly until your desired subscreen is displayed. The subscreens change

[How to quit] Press the ESC key.

[Description]

(1) First screen


① DVR-545HX/WY ② VERSION : 2.**
③ SYSCON : RELEASE_424
Rev :1.13877. 4. 63
④ TUNERCON : 483. 079 OK
⑤ DRIVE : DVD-RW DVR-L11X OK
1.05 OK
⑥ HDD : WDC WD1600BB-xxGUCx 160
⑪ TBCON : 119. 000
⑦ DEVICE : E2R-FE ⑧ FLASH : 64M
⑨ REGION : 2 ⑩ C : **********
⑫ DTB H : 420 ⑬ DTB S : 150e OK

OK : Appropriate version compared with that of the firmware of the system control computer
NG- : The version of the TUNER microcomputer is older.
Measures to be taken:
• Download the firmware.

OK : The appropriate drive is mounted.
NG : An inappropriate drive is mounted.
Measures to be taken: Download the firmware.

OK : Appropriate version compared with that of the firmware of the system control computer
NG- : The version of the drive microcomputer is older.
Measures to be taken: Download the firmware.

OK : Appropriate version of the DTBCON
NG+ : The version of the drive DTB microcomputer is advanced.
Measures to be taken: Download the firmware.
NG- : The version of the DTB microcomputer is older.
Measures to be taken: Download the firmware.

① Model name/destination
② Version of the recorder software
③ Revision No. of the system-control computer software
④ Version No. of the tuner microcomputer
Result of the combination ckeck with system u-com
⑤ Information on the built-in drive
(Model name, version No., model type)
⑥ Data of the built-in HDD, capacity of the HDD
⑦ DEVICE information (EMMA type, ES No.)
⑧ FLASH ROM information
⑨ Region No.
⑩ CPRM information (CPRM key No.)
⑪ EXPANDCON information (Version)
⑫ DTB hardware information (Version)
06EU : 420
⑬ DTB u-com information (Version)

• Details on HDD data are described below:

HDD : WDC10234564 # 160

- Capacity of the HDD (unit: Gbytes)
- HDD identification error indication
- Name of manufacturer, part No. by manufacturer

If any abnormality exists in HDD connection, the indications shown in Table 1 below are displayed.

Table 1: HDD recognition status represented by the HDD data display

HDD identification conditions	Example of HDD data to be displayed	Remarks
Failure in physical identification of HDD (no connection, defective HDD, interface error)	Blank space	• Check the connection to the ATA connector. • Replace the ATA flexible cable and connector. • Replace the HDD. • Replace the resistor in the ATA communication line.
Physical identification of HDD possible, but not identified (CPRM ID is not input.)	WDC 10234564 # 160	• Input the CPRM ID.
Physical identification of HDD possible, HDD identified, but failure in logical formatting	WDC 10234564 ! 160	"!" represents an HDD-recognition error. • Initialize the HDD or erase all titles.
Physical identification of HDD possible, HDD identified, and correct logical formatting (HDD correctly identified)	WDC 10234564 160	

If an error indication in the HDD data does not disappear even after the above measures were taken, refer to another sheet of "HDD Service Mode."

(2) Simple diagnosis of the RF level (Subscreen 1)

[Purposes] To check the RF signal of the U/V tuner by checking the input frequency difference and AGC voltage in this debug mode

[How to enter] While the User Setting display is displayed, press the [ESC], [DISP], then [DIG/ANA] keys, in that order.

[How to quit] Press the [ESC] key.

[Description]

```
DVR-545HX/WY      VERSION : 2.**
  SYSCON   : RELEASE_***
             Rev    :1.******
TUNERCON   : 483. 079                OK
   DRIVE   : DVD-RW DVR-L11X         OK
             1.05                    OK

     HDD   : WDC WD1600BB-xxGUCx     160

    TBCON  : 119. 000

   DEVICE  : E2R-FE    FLASH : 64M
   REGION  : 2         C : *********
   DTB  H : 420        DTB  S :150e    OK

  Input CH : ** ch
  Freq Diff : Low 1
  AGC Volt : **** mV
```

- Input channel
- Input frequency difference
- AGC voltage

Subscreen 1

1) Frequency Difference (Freg Diff)

How much tuning is off is monitored, as shown below:

Input Frequency	Display
Faraway	High 7
High (within 200kHz)	High 1~5
Just Tune	Center
Low (within 200kHz)	Low 1~5
Low (over 200kHz)	Low 7

2) AGC voltage (AGC Volt)

The gain controlled by the tuner is monitored to infer the input electric field intensity.
(The accuracy of inference differs depending on the product.)

	Field Intensity	AGC VOL
Intense field area (Clear image)	70 dBμ or more	3100 mV or less
Less intense field area (Noise may be generated.)	50 dBμ or more 70 dBμ or less	3100 - 4400mV
Weak field area (Much noise. EPG/VPS/PDC sometimes cannot be obtained.)	30 dBμ or more 50 dBμ or less	4400 mV or more (It is unable to discriminate under the weak field area.)
Very weak field area (Image damaged. EPG/VPS/PDC cannot be obtained.)	30 dBμ or less	4400 mV or more (It is unable to discriminate.)

Tips:

For good reception, the field intensity must be 50 dBμ or more (AGC Volt 4400 mV or less).
For accurate measurement, use a field intensity meter.

(3) Simple Error Rate Measurement (Subscreen 2)

[How to enter]
- While the User Operation screen is displayed, press the [ESC] then [DISP] keys, then the [DIG/ANA] key twice, in that order.
- While subscreen 1 of the first screen is displayed, press the [DIG/ANA] key.

[How to quit] Press the [ESC] key.

[Measurement procedures]

① Display subscreen 2.
② Load the Test disc (GGV1025).
③ Judge the results of the error rate measurement by referring to Table 1 on page 89.

ERR RATE : *.*e-*

Subscreen 2

[Tips]

During VR mode playback, the average value of the past 10 VOBUs is displayed. During DVD-Video or Video mode playback, the average value of the past 256 sectors is displayed.
During VR mode playback, the speed ratio of the drive (/: normal, no indication: double speed) is also displayed.

Table 1: Thresholds when determining OK or Error

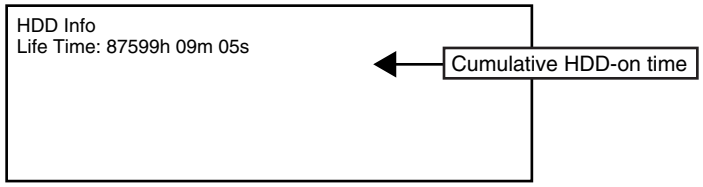
Disc type	Recording mode	Finalized or not finalized	Reference value
DVD-VIDEO	–	–	8.0×10^{-4}
DVD-R	Video mode	Finalized	1.0×10^{-3}
		Not finalized	1.0×10^{-3}
DVD-RW	Video mode	Finalized	1.0×10^{-3}
		Not finalized	1.0×10^{-3}

(4) HDD information (Subscreen 3)

[How to enter]
- While the User Operation screen is displayed, press the ESC then DISP keys, then the DIG/ANA key three times, in that order.
- While subscreen 2 of the first screen is displayed, press the DIG/ANA key.

[How to quit] Press the ESC key.

[Mode description]



Subscreen 3

[Tips]

- **How the data on cumulative HDD-on time are processed in memory**

  Storage place:
  FLASH ROM

  Timing of referring to the data on cumulative HDD-on time:
  When the power is turned on, fails, the FLASH ROM is referred to.

  Timing of updating the data on cumulative HDD-on time:
  While the HDD is on, the data on cumulative HDD-on time in the RAM is updated every 3 seconds, and every time updating is executed the data are stored in the Backup SRAM. When the power is turned off, the data are stored in the FLASH ROM.

- **How to clear the data on cumulative HDD-on time**

  FLASH ROM:
  When the HDD Identification Setting is performed, the data on cumulative HDD-on time are automatically cleared. The HDD Identification Setting is automatically performed when the CPRM setting is performed on the CPRM setting screen (to display the CPRM setting screen, press the ESC then the STEREO keys).

  Notes:
  - The data on cumulative HDD-on time are not cleared when resetting to factory-preset values is performed.
  - The data on cumulative HDD-on time are not cleared when the system-control computer software is downloaded.

(5) OSD FILTER SETTING (SUB screen 4)

[Purpose] Depending on the monitor used, the character flicker on the OSD may stand out.
If a system, such as charavter flicker, appears on the monitor, select the filter response.

[Tools to be used]

Remote control unit for servicing
(GGF1381)

[How to enter]
- While the User Operation screen is displayed, press the ESC then DISP keys, then the DIG/ANA key four times, in that order.
- While subscreen 3 of the first screen is displayed, press the DIG/ANA key.

[How to quit] Press the ESC key.

[Setting procedures]

① Display subscreen 4.
② Select the setting from the key operation table.

OSD Filter Setting

OSD FILTER : 4

Subscreen 4

[Tips]

As the setting value becomes greater, jitter is reduced on a CRT display. However, as lines for characters appear thick, complex characters may become difficult to read. On the contrary, as the setting value becomes smaller, jitter increases on a CRT display. However, as lines for characters become sharper, complex characters become more legible.

Note: Use the remote control unit for servicing.
Note: A new setting becomes active as soon as it is made. As a new setting is stored in nonvolatile memory, it will be retrieved when the unit it turned on the next time.
Note: After the factory-preset values are downloaded, the setting value for the OSD Filter will be the default value (4).

[(Table 2) Key operation of OSD Filter setting]

Key	Operation	Setting value	Remarks
[Rev x 3], [SPEED+] [x 3 Fwd], [SPEED-]	Changing the setting value for the OSD Filter	0 - 4 (Default value: 4)	[Rev x 3], [SPEED+] : The setting value increases by 1. [x 3 Fwd], [SPEED-] : The setting value decreases by 1.
[CLEAR]	The setting value is reset to default.	–	
[ESC]	To exit the OSD Filter Setting and clear the screen (Appears the tuner screen.)	–	–

2. ATA/ATAPI Debug Screen (Second screen)

[Purposes]

To be used as a rough guide to judge whether the pickup unit is all right or not

- Dirt on the pickup lens
- Degradation of the laser diodes for reading CDs and reading/writing to/from DVDs

[Tools to be used]

Remote control unit for servicing (GGF1381)

Aluminum-coated test disc (GGV1025)

[How to enter]

- While the User Operation display is displayed, press the ESC, DISP, then 2 keys, in that order.
- While any subscreen of the second screen is displayed, press the DIG/ANA key repeatedly. The subscreens change cyclically.

[How to quit] Press the ESC key.

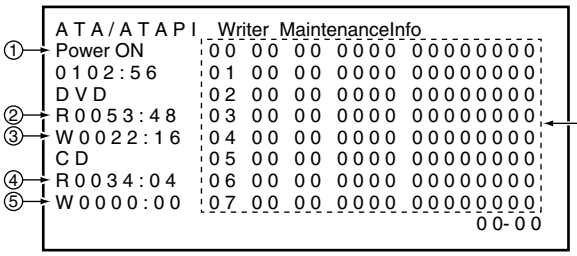
(1) Writer maintenance information of ATA/ATAPI DEBUG OSD (Subscreen 3)

[How to enter]

- While the User Operation screen is displayed, press the ESC, DISP then 2 keys, then the DIG/ANA key twice, in that order.

[How to quit] Press the ESC key.

[Procedures] Update the display by pressing the SEARCH key while subscreen 3 is displayed.



Error log for the Writer (Not for Service)

① Power-on time/cumulative power-on time
② Duration of emission of the laser diode (LD) for DVD-R/DVD while reading
③ Duration of emission of the LD for DVD-W/DVD while writing
④ Duration of emission of the LD for CD-R/CD while reading
⑤ Duration of emission of the LD for CD-W/CD while writing (This function is not used for this model.)

② If the total hours of duration of emission of the laser diode (LD) for DVDs while reading ② and that of emission of the LD for DVDs while writing ③ exceed 4,700 hours, the LDs may be degraded. Perform an LD degradation judgment, using subscreen 4.

[Tips]

MTTF hours for each LD
DVD: 4,700 hours
CD: 11,000 hours
The ATA/ATAPI Writer Maintenance Info is obtained each time the power is turned on. Thereafter, the data on the subscreen is updated each time the SEARCH key is pressed (the updating command is sent) while this subscreen is displayed. Care must be taken when updating this subscreen, because an undesired command is inserted if it is executed while recording, etc.
[Note on lighting time data for each LD]
Since data on lighting time of each laser diode (LD) are stored in the flash ROM on the MAIN Assy, after the MAIN Assy is replaced, the data will be cleared. However, after the LOADER Assy is replaced, data on lighting time of each LD will be retained in the MAIN Assy. Therefore, before either the MAIN Assy or LOADER Assy is to be replaced, it is recommended that you write down the lighting time data.

(2) LD degration judgment of ATA/ATAPI DEBUG OSD (Subscreen 4)

[How to enter]
- While the User Operation screen is displayed, press the ESC, DISP then 2 keys, then the DIG/ANA key three times, in that order.

[How to quit] Press the ESC key.

[Notes]
- For correct measurement of items ① to ④ indicated in the display below, leave the unit at room temperature (25°C) for a while before turning it on, and do not load a disc.
- For RF measurement (item ⑤), it is recommended to use the Test disc (GGV1025).
  As the RF level differs depending on the characteristics of the pickup from product to product, it cannot be used for judging degradation of the LD. Use the RF level as a rough guide to know the difference between before and after lens cleaning.

[Procedures] To update the value for each item, press the SEARCH key while subscreen 4 is displayed.
For details on each item and the conditions of updating the values, see Table 2 below.

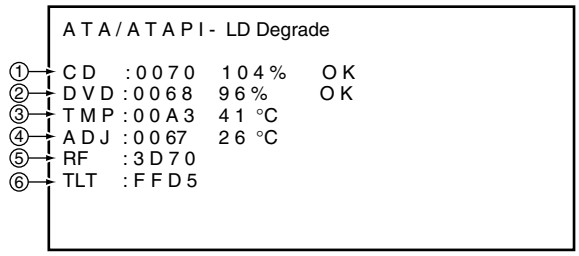


Table 2: Description of each item and conditions for updating data

No.	Item	Description	Conditions for updating by pressing the SEARCH key
①	CD	Degradation judgment of LD for CD. Regarded as NG when the value is 120% or higher (same standard as for the PC drive)	No disc inserted in the disc tray
②	DVD	Degradation judgment of LD for DVD. Regarded as NG when the value is 120% or higher (same standard as for the PC drive)	No disc inserted in the disc tray
③	TMP	Current temperature inside the Writer	No disc inserted in the disc tray
④	ADJ	Temperature (approx. 25°C) inside the Writer during adjustment	No disc inserted in the disc tray
⑤	RF	RF level (16-bit data, proportional calculation performed using the actual RF level value with 2.5 V = 0xFFFF as the maximum value, displayed in 4-digit hexadecimal)	During playback of disc medium (GGV1025)
⑥	TLT	Writer adjustment data for straight (non-HDD) model (FFFF is diplayed when the writer is not adjusted.)	No condition

If the results of degradation of the LDs for CDs and DVDs are both NG, replace the drive.

3. VR-Recording-Related Error Logs (Fourth screen)

[Purposes]

To roughly determine in which category shown below a symptom that is difficult to reproduce belongs.
For details on the categories of error logs displayed, see "Table 1: Description of VR-recording-related errors."

- Errors related to the MPEG Encoder
- Errors related to the drive system
- Errors related to copying
- Errors related to others
- Errors related to the HDD

[Tool to be used]

Remote control unit for servicing
(GGF1381)

[How to enter]

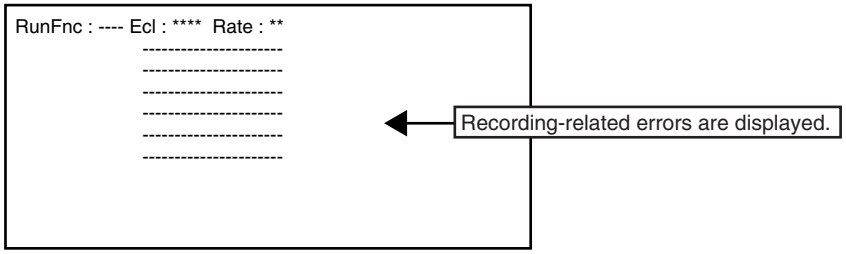
- While the User Operation display is displayed, press the [ESC], [DISP], then [4] keys, in that order.
- While any subscreen of the fourth screen is displayed, press the [DIG/ANA] key repeatedly.
  The subscreens change cyclically.

[How to quit] Press the [ESC] key.

[Description of each subscreen]

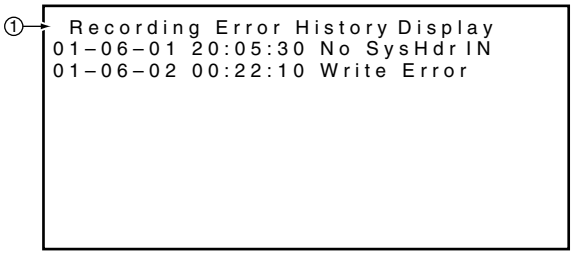
(1) VR-Recording-Related Error Logs (Subscreen 1)

- Errors related to recording are displayed on the lines "Rec Err:," as shown below.
  For details on errors, see "Table 1: Description of VR-recording-related errors."



(2) Subscreen 2 and 3 (These subscreens are not for service use.)

(3) VR-Recording-Related Error Logs (Subscreen 4)



① There are two error-log screens, on which up to 9 logs per screen are displayed.
(generation time [year-month-day, hour:minute:second], error data in simplified description)

[Tips]

- The two error-log screens can be switched by pressing the [SPEED+] or [SPEED-] key.
- For details on error messages, see Table 1 "Description of VR-recording-related errors".

(4) Subscreen 5 to 11 (These subscreens are not for service use.)

Table 1: Description of VR-recording-related errors

Any error message marked with * is displayed "RecErr : ---------" on the Subscreen 1 of the fourth screen.

● Error related to MPEG Encoder

Error Message	Description
AVEnc Hang	AVEncoder failed
IN Encode *	Changes cannot be made in the process of encoding
No SysHdr IN	System packet is not input periodically
Stm Start NG	Failure to start encoding (reasons not clear)
Stream NG	Inappropriate input stream data
Strm Start NG	Timeout waiting for system packet input at the beginning

● Error related to Drive system

In a case of an error in the drive system, scratches or dirt on a disc, or a problem of the drive itself (dirty pickup) may be suspected.

Error Message	Description
Bdr Cls NG	Close Border failed
Bdr Opn NG	Open Border failed
BUF Overflow	Overflow of the Stream Buffer
CLS Rzon Fail	Video Mode Close Rzone failure
Drive Hang	The Drive is hung up.
Drv Err	General error of the drive
Drv Hard Err	Abnormality in the drive hardware or firmware
Drv TimeOut	Timeout waiting for drive operation
Fail Repair	Repair failed
Format NG	Format failed
May Be V mode	Although TMP_VMGI is not written, it may be Video Mode disc.
Mech No Res	No response from the mechanical-control computer
MKB Invalid	MKB reading error
NWA Exhaust	NWA surpassed and impossible to use
OPC NG	OPC failed
PCA Full	PCA has been used up.
Read Err	Reading failed, ECC failed, etc.
ReadOnly DISC *	Because some data are invalid, data cannot be written
RMA Full	RMA has been used up.
Rzn Cls NG	Close RZone failed
Rzn Rpr NG	Repair RZone failed
Rzn Rsv NG	Reserve RZone failed
TMP-VMG WrErr	Video Mode TMP VMGI Write Error
VTSI_B Wr Err	Video Mode VTSI BUP Write Error
VTSI_B2 Wr Err	Video Mode VTSI BUP Write Error (After Layer Change)
VTSI Wr Err	Video Mode VTSI Write Error
VTSI2 Wr Err	Video Mode VTSI Write Error (After Layer Change)
Write Err	The Drive failed to write and could not be recovered.
May Be PVR	May be +VR disc, but no RSAT
V Final fail	Abnormal process occurred when finalizing Video mode
DLVR trace NG	Close Rzone failed at dual layer disc

RSAT : Reserved Space Allocation Table

● Error related to Dubbing

Error Message	Description
H2D CP SomeNG	Other NG HDD →DVD copy
Mem get NG	Video Mode Copy Memory has not ensured.
Strm TransfNG	Video Mode Copy Stream Transfer NG
Tracon Trn NG	Video Mode Copy Tracon tranfer has not been completed.
VC Cell Max	Maximum number for Video Mode copy Cells exceeded
VC CopyCancel	Video Mode Copy Copy Cancel
VC FlushC NG	Video Mode Copy Flush Cache NG
VC HDD C Err	Obtaining Video Mode Copy HDD Cell information failed
VC HDD Inf NG	No information on Video Mode Copy HDD
VC HDD Info NG	Format failed
VC Idling NG	Video Mode Copy idling NG
VC Pck Anl NG	Analizing Video Mode Copy Pack failed

● Error related to Dubbing (continued)

Error Message	Description
VC Transf Stp	Video Mode Copy Transfer Stop
VC TSO BLK NG	Video Mode Copy TSO Block transfer has not been completed.
VC VOBU SizeE	Video Mode Copy VOBU Size NG
V Rsv RzoneNG	Video Mode Copy Reserve Rzone failed
V2H APP FL NG	VR → HDD APP FLG is OFF
V2H Aud Ch NG	VR →HDD Audio Channel NG
V2H Aud Md NG	VR →HDD Audio Mode NG
V2H Aud Stm N	VR →HDD Audio Stream number NG
V2H SRC Prot	VR →HDD copy prohibitted material
V2H Unknown	VR →HDD other NG
V2H VOBU TMNG	VR →HDD Play back time of each VOBU is different
V2H V Reso NG	VR →HDD Video resolution NG
H2D CP NoSpac	HDD →DVD insufficient free space for copy
H2D TO HDDRD	HDD →DVD (VR) TimeOut at HDD playing side
H2D TO SPRO	HDD →DVD (VR) TimeOut at internal processing
H2D TO DVDWR	HDD →DVD (VR) TimeOut at HDD recording side

● Other Errors

Error Message	Description
Abort *	Cancellation
Already open	Extension file is already opened.
BK BATT Down	Backup RAM data has been erased.
BK FSYS Dirty	Backup RAM data has not been wrtten on the File Sys.
BUG	Some bugs
BusReset Done	Bus Reset has been excecuted.
Cell Close NG	Cell Close NG
CPRM IC NG	Inappropriate CPRM IC
Dir Depth Err	Tree of Directory is too deep.
Disc Full	No further data can be written because the disc is full.
DRAM CLR Err	Video Mode DRAM (Stream Buffer) Clear failure
DRAM NG	Abnormality in access to the Work DRAM
Drive Destroy	The drive has crashed.
EncModul Hang	Encoder routine is hung up.
F Alrdy Exst	Extension file is already exist.
File cansel	Extension file is canseled.
FileNot Exist	Extension file is not exist.
Format Excec	Formatting has been executed.
Invalid Disc *	The disc cannot be recognized.
Invalid Param *	Invalid parameter
Invalid TMVMG	Invalid TMP_VMGI content
Invalid UDF *	Invalid UDF content
Invalid VMG *	Invalid VMG content
Invalid VTSI	VTSI information of +VR is unusual.
Irr Action *	Incorrect action
MKB REVOKED	Error in gaining data
Limit Over *	Standard maximum limit exceeded
No More Info *	No more space in the internal work-management area
No Permission *	No permission to write to the disc
No Video	No video input (not locked)
Now Busy *	In the process of the emergency processing
NV Pck DMA Er	Inappropriate NaviPack DMA
NV Pck MK Err	Error in creating NaviPack
Ourob Strm NG	Inappropriate stream data to the Ouroboros input
Over Heat	Abnormal temperatute
PARAM NO ACCP	Recording parameter is not matched.
Process Over	Process is overfull.
Protect Src *	Source to be recorded is copy-protected.
Rec Pause *	No operation permitted during recording pause
Relocation Do	VR-recording data was relocated

● Other Errors (continued)

Error Message	Description
Repair Excec	Repairing has been executed.
Something *	Undetermined error
SRAM NG	Abnormality in access to the backup work SRAM
Status NG *	Abnormality in change of statuses
SW PVR	Switch to +VR playback process
SW Vpb mode *	Switching to video playback routine is required.
SW Vrec mode *	Switching to video recording routine is required.
Unmatch Stamp *	Impossible to modify because of nonmatching time stamp
VBR-SRAM NG	Abnormality in VBR SRAM
V Categ ID NG	Inappropriate Category ID
V Cate Inf NG	Inappropriate Category information
V Ext MAX Ovr	Count Max exceeded
V ExtToo Big	The extension file is too large.
V Ext TY NG	Type NG
Virgin DISC	Virgin Disc
VOBU Info NG	Inappropriate VOBU information
WaterMark Det	Watermark detected
WM Cracked	WM Cracked
Param Short	Editting Error (Clear A-B)
Invalid VRMI	Information of +VR is NG. (VRMI)

● Error related to HDD

Error Message	Description
Do nothing	Do nothing for demand.
ESFSYS CORUPT	easyfsys error
ESFSYS INIT	easyfsys initializing
HDD Buff High	High-level process executed for the HDD Buffer
HDD DEF DONE	HDD deflag finished
HDD DEF ERR	HDD deflag error
HDD Destroy	HDD is not recognized on the bus.
HDD INFO BAD	Incorrect HDD Management Data
HDD Initialize	HDD initialized
HDD IRRG POFF	Abnormal power off
HDD MBR NG	Inconsistent MBR data
HDDReset Done	HDD Reset executed
HDD ROMSUM NG	Rom-code check sum NG
HDD SIG NG	Inconsistent HDD Management Data Magic
HDD SMART NG	Inappropriate HDD SMART
HDD Trans Err	DMA error in HDD copy transfer
HDD unauthor	Inconsistent HDD serial No.
HDD Zero WR	MBR was witten
Task No Activ	Task has not been activated.
TT Rec Over	Title recording time full
HDD WRONG TGT	Invalid HDD target No. is directed.
extHDD Ignore	External HDD is dismounted.
HDD PFile NG	Program file installed in HDD is NG.
HDD DEL TT	Delete the title by HDD recovery.
HDD DEL PL	Delete the dubbing list by HDD recovery.
HDD DEL OC TT	Delete the title moving on the way inside HDD

● No Error

Error Message	Description
Non Err *	Normal

Abbreviations:

ECC = 4 byte Code for Error Correction
UDF = Universal Disc Format
PCA = Power Calibration Area
OPC = Optical Power Control
NWA = Next Writable Address
VMG = Video Manager
RMA = Recording Management Area
MKB = Media Key Block
TMP_VMGI = Temporary Video Manager Information
Border = from Lead-in to Lead-out

7.1.6 DV DEBUG MODE

1. DV debug

[Purpose]

To check whether communication between a DV device and the unit is normal when a DV device is connected

[Tools to be used]

Remote control unit for servicing (GGF1381)

- DV device
- DV cable

[How to enter] Press the ESC , DISP then 3 keys, in that order.

[How to quit] Press the ESC key.

[Mode description]

① **(DV/1394) InitDV:**OK **InitVE:**OK **AV**:02 **DV**:01

② [**Recorder**] **GUID:**00E0360006100001 IRM
③ **iPCR**:C03F0000 **oPCR**:0000007A
④ [**DV**] **GUID:**0080880303480E96
⑤ **VN:**VICTOR **MN:**GR-D50K
⑥ **TM:**C3 **TS:**75 **CT:**32 **WP:**01 **PS:**FF **OS**:00
⑦ **CA:**A000002020 **CV:**FF **MD:**VTR
⑧ [**DVdecode:**Yes] **LineSys:**525-60
⑨ **TC:**00h20m35s **RD:**02/02/05 **RT:**10h34m50s
⑩ **ASPECT:**4:3 **CGMS:**000000 **APSTB:**00 **DEC:**525-60
⑪ **SF:**32KHz **QU:**12bit **AMODE:**4) Stereo

Boldface alphanumerics : Fixed indications
Nonboldface alphanumerics : Variable indications

No.	Item	Description	Remarks
①	InitDV	Whether the initialization of UPD72893B(1394 LINK and DV codec IC) has been completed (OK) or not (NG)	If NG is displayed, it is considerd the communication failure to UPD72893B. (Note 1)
	InitVE	Whether the initialization of ADV7172 (Video Encoder for DV specific) has been completed (OK) or not (NG)	If NG is displayed, it is considerd the communication failure to ADV7172. (Note 2)
	AV	Number of AV devices recognizing connection	Identification number of AV devices including D-VHS, Digital Tuner, etc other than DV devices.
	DV	Number of DV devices recognizing connection	If the number does not become 01 even if a DV device is connected, identification of that device fails.
②	GUID	GUID set in ConfigROM of the unit	GUID : Global Unique ID (Specific ID for DV devices) If the unit is ROOT (IRM), IRM is displayed at the side position of GUID display.

Note 1 : NG shall be displayed excluding "Copy from a DV source", "DV Video Playback" and "DV Video Settings" mode, because UPD72893B is being reset excluding those mode.

Note 2 : NG shall be displayed excluding "Copy from a DV source", "DV Video Playback" and "DV Video Settings" mode, because ADV7172 is being reset excluding those mode.

No.	Item	Description	Remarks
③	iPCR	iPCR value of the unit	
	oPCR	oPCR value of the unit	
④	GUID	GUID set in ConfigROM of the connected DV device	Data are displayed only if one DV device is identified. If the connectd DV device is ROOT (IRM), IRM is displayed at the side position of GUID display.
⑤	VN	Vendor name set in ConfigROM of the connected DV device	Data are displayed only if one DV device is identified. (Depending on the device, the vendor name may not be set in ConfigROM.)
	MN	Model name set in ConfigROM of the connected DV device	Data are displayed only if one DV device is identified. (Depending on the device, the model name may not be set in ConfigROM.)
⑥	TM	Transport Mode data obtained from the DV device	Data are displayed only if one DV device is identified.
	TS	Transport State data obtained from the DV device	
	CT	Cassette Type data obtained from the DV device	
	WP	Write-protection data obtained from the DV device	
	PS	Power-state data obtained from the DV device	
	OS	Output signal mode data obtained from the DV device	
⑦	CA	Connect AV data obtained from the DV device	Data are displayed only if one DV device is identified.
	CV	Camera/Vtr mode data obtained from the DV device	
	MD	DV device mode	Camera or VTR is displayed only if one DV device is identified.
⑧	[DVdecode:XXX]	Whether Yes (in the process of requesting DV input) or No is indicated in XXX	Normally, Yes is indicated only when CH is set to DV.
	LineSys	Input Line System setting	
⑨	TC	Time-code data of the DVdecode Stream, or response data of the Time Code command	Stream time-code data are obtained when the tape is played in forward direction. Otherwise, time-code data are obtained through an AV/C command.
	RD	Rec Date of DVdecode Stream	
	RT	Rec Time of DVdecode Stream	
⑩	ASPECT	Aspect Ratio of DVdecode Stream	
	CGMS	CGMS of DVdecode Stream (from left to right, CGMS data of bits 5-4: Audio ch 2, bits 3-2: Audio ch 1, and bits 1-0: Video)	*CGMS (Copy Generation Management System): The two-digit codes added to broadcast programs represent the following: 00: Copy freely, 10: Once copy, 11: Never copy
	APSTB	APS trigger bit of DVdecode stream	
	DEC	With/without DVdecode stream input	With input: Signal type (525-60, 625-50, 1125-60, 1250-50, or Invalid) is indicated, Without input: "No" is indicated.
⑪	SF	Sampling Frequency of DVdecode Stream	If SF is 44 kHz, it is considered that 44.1-kHz audio is input, and sound is muted on the unit.
	QU	QUANTIZATION of DVdecode Stream	
	AMODE	AUDIO MODE of DVdecode Stream	

2. Simple Diagnosis of DV

Symptoms		Location in the Debug Screen	Items to be Checked, and Conditions	Possible causes
No operation for DV input	1	DV ①	Check the initDV indication: OK: Initialization of DV related LSI (IC102, IC108) appropriately completed. NG: Initialization of DV related LSI (IC102, IC108) has not been completed properly. Defective communication with DV related LSI (IC102, IC108) and Host u-com (IC1001) (Note 1)	Defective IC102(1394Link & DVcodec)/ IC108(1394PHY), improper connection between IC102 / IC108, defective soldering, defective power supply, etc.
	2	DV ①	Check the number of DV devices when one DV device is connected to the recorder: 01 : The connected DV device is correctly identified. Other than 01 : The connected DV device is not correctly identified.	Defective DV terminals, improper connection of the DV-terminal board, defective IC108(1394PHY), defective cables, an IEEE 1394 device other than the DV device connected.
No picture nor sound for DV input	1	DV ⑧	Check of DV decoding when the recorder channel is set to DV: Yes: The recorder is in the process of a DV input operation No: The recorder is not executing a DV input operation	Defective IC102(1394Link & DVcodec), defective soldering, defective power supply, etc.
	2	DV ⑩	Check DEC: 525-60: An NTSC DV signal is input from the DV device. 625-50: A PAL DV signal is input from the DV device. No: No DV signal is input from the DV device.	Defective DV terminals, improper connection of the DV-terminal board, defective source device defective IC102(1394Link & DVcodec), IC108(1394PHY) **Note:** As to a model having the Input Line System setting, if the setting and the actual input signal system do not match, no picture appears.
DV input recording impossible	1	DV ⑩	Check CGMS:	Recording cannot be performed for a copy-protected source.
No sound for DV input	1	DV ⑪	Check SF: 32 khz: An audio signal with 32-kHz sampling frequency is being input. 48 khz: An audio signal with 48-kHz sampling frequency is being input. 44 khz: An audio signal with 44.1-kHz sampling frequency is being input.	An audio signal with 44.1-kHz sampling frequency is muted.
No picture for DV input	1	DV ①	Check the initVE indication: OK: Initialization of DV specific VideoEncoder (IC101) appropriately completed. NG: Defective communication with DV specific VideoEncoder (IC101) and HOST u-com (IC1001). Initialization of DV specific VideoEncoder (IC101) has not been completed properly. (Note 2)	Defective IC101(DV specific VideoEncoder), defective soldering, defective power supply, etc.

Note 1 : NG shall be displayed excluding "Copy from a DV source", "DV Video Playback" and "DV Video Settings" mode, because DV related LSI (IC102, IC108) are being reset excluding those mode.

Note 2 : NG shall be displayed excluding "Copy from a DV source", "DV Video Playback" and "DV Video Settings" mode, because DV specific Video Encoder (IC101) is being reset excluding those mode.

7.1.7 EPG SERVICE MODE

[Purposes]

Reasons for the following malfunctions can be inferred by checking the conditions for obtaining the past EPG data:

① EPG data cannot be obtained.
② Some EPG data obtained are missing.

[Tool to be used]

Remote control unit for servicing
(GGF1381)

[How to enter] • Press the [ESC], [DISP], [7] keys, in that order.

[How to quit] Press the [ESC] key.

[Description of the mode]

1. Summary screen

```
    0         1         2         3         4
    01234567890123456789012345678901234567890123456789
00  (EPG EURO)
01  Next Data  Download Time : 14:00
02             Duration     : 01h30m
03  Gemster Data  Fail Count  : 00
04
05
06
07  EPG Data Receive Err Summary
08  Date  Start  End   MD  CH  RcvPkt   TotalErr
09  03/31 13:00 13:30 DL  03  001853   000000
10  03/31 09:00 11:00 DL  03  001192   000000
11  03/31 08:00 08:05 HS  --  000645   000000
12  03/31 00:00 00:00             000000   000000
13  03/31 00:00 00:00             000000   000000
14  03/31 00:00 00:00             000000   000000
```

Lines 01-02	The next download starting time for the EPG data is displayed. Next Data Download Time: Starting time Duration: Duration required for acquiring the EPG data
Lines 03	The Gemster EPG data cannot be found. Number times of Host Scan and Schedule Download, DT models only
Lines 09-14	The 6 latest error logs when EPG data were received are displayed, with the latest one at the top.

Date	: Month/day when reception started
Start	: Time when reception started
End	: Time when reception ended
MD	: Method for acquiring the EPG data (HS: Host scanning process, DL: Downloading process of the EPG data)
CH	: Data-receiving channel
RcvPkt	: Total number of received packages. A number 999,999 or greater is displayed as "999999."
Total Err	: Total errors during reception. The sum of Hamming Err, Trans Err and InvLine Err numbers indicated on the Detail screen. A number 999,999 or greater is displayed as "999999."

[Tips] In a case where only "HS" is displayed in the MD column of the logs, the host channel has not been found. It is necessary to check the country and postal-code settings in the user settings.

2. Detail screen

[How to enter] Press the DIG/ANA key while the Summary screen is displayed. Up to 6 detail screens (1 to 6) are displayed, one each time the DIG/ANA key is pressed. Each detail screen 1 to 6 corresponds with the EPG reception error logs from the top on the Summary screen.

[How to quit] Press the ESC key.

[Description of the Detail screens]

```
    0         1         2         3         4
    01234567890123456789012345678901234567890123456789
00  (EPG EURO)
01  EPG Data Receive Err Details - 1
02
03  Date : 03/31
04  Start Time : 13:00   END Time  : 13:30
05  Host CH    : 03      P-ON Kind : Download
06
07  Data Receive Part   Total Err  : 000000
08  Pkt Rcv Num  : 001853  Pkt Snd Num : 001853
09  Inv Line Err : 000000
10  Slice Cont : Auto EQ : OFF LV : -h
11
12  Temporary  Buffer  Information
13  Pool  Num   : 000000  Max  Store  : 000000
14  Discard Pkt  : 000000  Use  Num   : 000000
```

Line	Display item	Description	Remarks
Line 01	EPG Data Receive Err Details-X	The rightmost figure represents the number of the current detail screen. This number corresponds to the order of the EPG reception error log from the top.	
Lines 03-05, Reception conditions	Date Start Time END Time Host CH P-ON Kind	: Month/day when reception started : Time when reception started : Time when reception ended : Data-receiving channel : Methods for acquiring the EPG data (host scanning and downloading)	Only during initialization, host scanning is automatically executed to find the host broadcast.
Lines 07-10, details on errors during reception	Total Err	: Total numbers of errors during reception. The total number of Hamming Err, Trans Err and InvLine Err indicated on the Detail screen. A number 999,999 or greater is displayed as "999999."	Total Errors: If the total number of errors reaches two digits or greater, it is likely that EPG data acquisition failed. Display subscreen 1 of the first screen and check the electric field intensity from the AGC level.
	Pkt Rcv Num Pkt Snd Num	: Total number of received packages. A number 999,999 or greater is displayed as "999999." : Total number of packages that were sent to the application program among all the received packages. A number 999,999 or greater is displayed as "999999."	If the total number of received packages is 0, it is likely that the country and postal-code settings are wrong.
	InvLine Err	: Total number of errors that were generated by receiving data from invalid lines. A number 999,999 or greater is displayed as "999999."	
	Slice Cont	: Slice level control Auto-Tu Con, Manual - Syscon.	
	EQ	: Equalizer setting (ON, OFF)	
	LV	: Slice level (10~30 hex) (Only when the slice Cont is Manual.)	

Note: The data on lines 12-14 are for software development, not for service use.

7.1.8 HDMI DEBUG MODE

[Purposes]

To check the statuses of the connected HDMI devices.

[Tool to be used]

Remote control unit for servicing (GGF1381)

- HDMI device
- HDMI cable

[How to enter] • Press the ESC, then DISP key 24 times.

Note: Do not press any key on the remote control unit supplied with the unit or for servicing while the HDMI debug screen is displayed.

[How to quit] Press the ESC key.

[Description of the mode]

1. HDMI MAIN information screen (First screen)

```
00 [HDMI]                                1/6
01  Connect:***   Reso :*********    Audio:***
02  DevType:****  Color:**********   APath:*****
03  TMDS  :***   HDCP :** : **      Fs  :***
                          SType:
[Video Check]
  Pic_Asp   :
  Active_Asp :
[Copyright Control Check]
  ACP_Type:       (Actual send:      )
  ChSts0:  ChSts1:  (C: , L: )
[Digital Tuner]
  HDMI Out: AC3 32kHz
  LL SPDIF: AC3 32kHz   DAC: 32kHz
```

(*1) [Tips]
Because all the data on connection and authenti--cation are canceled once the function of the connected HDMI device is set to a position other than HDMI, all the debugging data in Table 1 are deleted.

Table 1: Description of the items on the HDMI main information screen

Line	Item	Description	Remark
1	Connect	Connection status of the HDMI device	See Table 2.
	Reso	Output resolution	See Table 3.
	Audio	HDMI audio output status	See Table 4.
2	DevType	Type of connected device	See Table 5.
	Color	Output color	See Table 6.
3	TMDS	TMDS (video stream) signal output status	See Table 7.
	HDCP	HDCP Authentication status	See Table 8.
	Fs	Output audio Fs	See Table 9.

Table 2: Connection status of the HDMI device

Indication	Description
ON	Connected
OFF	Not connected

Table 3: Output resolution

Indication	Description
480i NTSC	720x480i NTSC
480p NTSC	720x480p NTSC
720p NTSC	1280x720p NTSC
1080i NTSC	1920x1080i NTSC
1080p NTSC	1920x1080p NTSC
576i PAL	720x576i PAL
576p PAL	720x576p PAL
720p PAL	1280x720p PAL
1080i PAL	1920x1080i PAL
1080p PAL	1920x1080p PAL
----------	TMDS Off

[Description of the Main screen] (Continued)

Table 4: HDMI audio output status

Indication	Description
OFF	Output: Off
ON	Output: On

When the unit is connected to DVI device (refer to Table 5), the Audio is not outputted.

Table 5: Type of the connected device

Indication	Description
------	Not connected
HDMI	It has been confirmed that an HDMI device supporting HDCP is connected.
DVI	It has been confirmed that a DVI device supporting HDCP is connected.

When the unit is connected to device with no HDCP support, this display is "------".

Table 6: Output color

Indication	Description
YCbCr4:2:2	Component 12 bits (YCbCr4:2:2)
YCbCr4:4:4	Component (YCbCr4:4:4)
RGB(0-255)	RGB full range (0-255)
RGB(16-235)	RGB (16-235)
----------	TMDS Off

Table 7: TMDS signal output status

Indication	Description
OFF	Output: Off
ON	Output: On

Table 8: HDCP

Left side : HDCP Authentication Status

Indication	Description
--	If an device supporting HDCP is connected, HDCP authentication is in progress.
OK	HDCP authentication succeeded.

Refer to this item only when HDMI or DVI is displayed for the item for the type of the connected device (Table 5).
If OK is not displayed although HDMI or DVI is displayed, it means that the HDCP authentication failed.

Right side : Check Revocation list

Indication	Description
--	Checking that the connected device (all downstream devices) is not registered to the Revocation list, or so.
OK	The connected device (all downstream devices) is not registered to the Revocation list.

Refer to this item only when HDMI or DVI is displayed for the item for the type of the connected device (Table 5).
When there is also no valid SRM (include Revocation list), "--" is displayed here.

Table 9: Fs

Indication	Description
32k	32kHz
44k	44.1kHz
48k	48kHz
96k	96kHz
96k/2	48kHz (original data of 96kHz is down-sampled.)
---	Audio Off

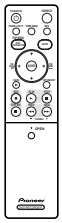
7.1.9 AGING MODE

[Purposes]

If symptoms regarding recording/ playback of discs and/or the HDD that your customer claimed are difficult to reproduce, they can be reproduced with a long-time test in Aging mode.

[Tools to be used]

Remote control unit for servicing (GGF1381)



Remote control unit supplied with the unit (VXX3092)

Commercially available, recordable DVD-R/+R and DVD-RW/+RW/ -RAM discs

[Notes]

- When aging for the DVD-RW/+RW/-RAM and HDD is executed, all recorded data on them will be erased.
- Commands from the remote control unit are accepted during Aging mode.
- If Aging mode is quit using the ESC key, indications on the FL display will return to normal display.
- Cancel timer settings before entering Aging mode.
- Set the recording rate beforehand. It cannot be changed during Aging mode.

[How to enter]

① Press the [DVD] key to switch to DVD.
② Load a recordable disc.
③ Select the input function of a recordable source.
④ After disc detection is performed, press the [ESC] then [REP.B], and then [PLAY] keys on the remote control unit for servicing to enter Aging mode.

[How to quit]

Press the [ESC] key on the remote control unit for servicing to quit Aging mode and return to Normal mode.

Notes:

- If during recording: Recording is stopped.
- If during playback: Playback is paused.
- If during initialization: The unit stops after initialization is finished. ← (aging for ±RW/-RAM only)
- If the tray is being opened/closed: The unit stops after the tray is opened/closed. ←

[Description of operation] **Aging for the DVD-RW/DVD-R**

Aging for the DVD-RW/+RW/-RAM	Aging for the DVD-R/+R
During Aging mode, the following operations are repeated in the order shown below. ① The tray opens. ② The tray closes. ③ Initialization ④ Recording for 60 minutes ⑤ Playback for 45 minutes <DVD-RW> The initialization process in step 3 follows the setting specified in "Setting of the main unit--Recording--Auto initialization of a DVD-RW." <DVD+RW> The initialization process in step 3 is the same as that described in "Disc setting--Initialization--Initialization of a DVD+RW." <DVD-RAM> In the initialization process in step 3, physical formatting is performed, if required. During Aging, the number of loops is indicated on the FL display, as shown below. [AGING 0001] If an error is generated, the aging operation stops. **Note:** Indications on the FL display are retained, and this information is also retained as an OSD.	During Aging mode, the following operations are repeated in the order shown below. ① The tray opens. ② The tray closes. ③ Recording for 1 minute ④ Recording pause for 6 minutes ⑤ Recording stops. ⑥ Playback for 1 minute ⑦ Playback pause for 6 minutes ⑧ Playback stops. **Note:** A continuous test of the above operations is possible for approximately 23 hours. After ② the tray closes, disc detection is performed, <DVD-R> In step 2, if the disc is judged to have recorded up to 99 titles, the operation stops at that point. <DVD+R> If the disc is judged to have recorded up to 49 titles, the operation stops at that point. On the FL display, the number of loops is retained. On the OSD display, the error indication is retained. During Aging, the number of loops is indicated on the FL display, as shown below. [AGING 0001] If an error is generated, the aging operation stops. **Note:** Indications on the FL display are retained, and this information is also retained as an OSD. **Note:** Recording time depends on the recording rate set. For example, if the recording rate is MN32, only up to 60 titles can be registered. Check the setting for recording rate before performing aging.

[Aging for the HDD]

[How to enter]

① Press the HDD key to switch to HDD.
② Press the ESC key then the REP.B, and then the PLAY keys on the remote control unit for servicing to enter Aging mode.

[How to quit]

Press the ESC key on the remote control unit for servicing to quit Aging mode and return to Normal mode.

Notes:

- If during recording: Recording is stopped.
- If during playback: Playback is paused.
- If during erasure of all memory data from the HDD, the unit stops after all memory data have been erased.

[Description of operation]

During Aging mode, the following operations are repeated in the order shown below.
① Erasure of all the memory data from the HDD
② Recording for 60 minutes
③ Playback for 60 minutes

* *Take caution as all recorded data of the HDD is deleted.*

[Tips]

During Aging, the number of loops is indicated on the FL display, as shown below.
[AGING 0001]

If an error is generated, the aging operation stops.

Note:
Indications on the FL display are retained, and this information is also retained as an OSD.

7.1.10 HDD CHECK MODE

How to diagnose failure of the hard disc drive (HDD)

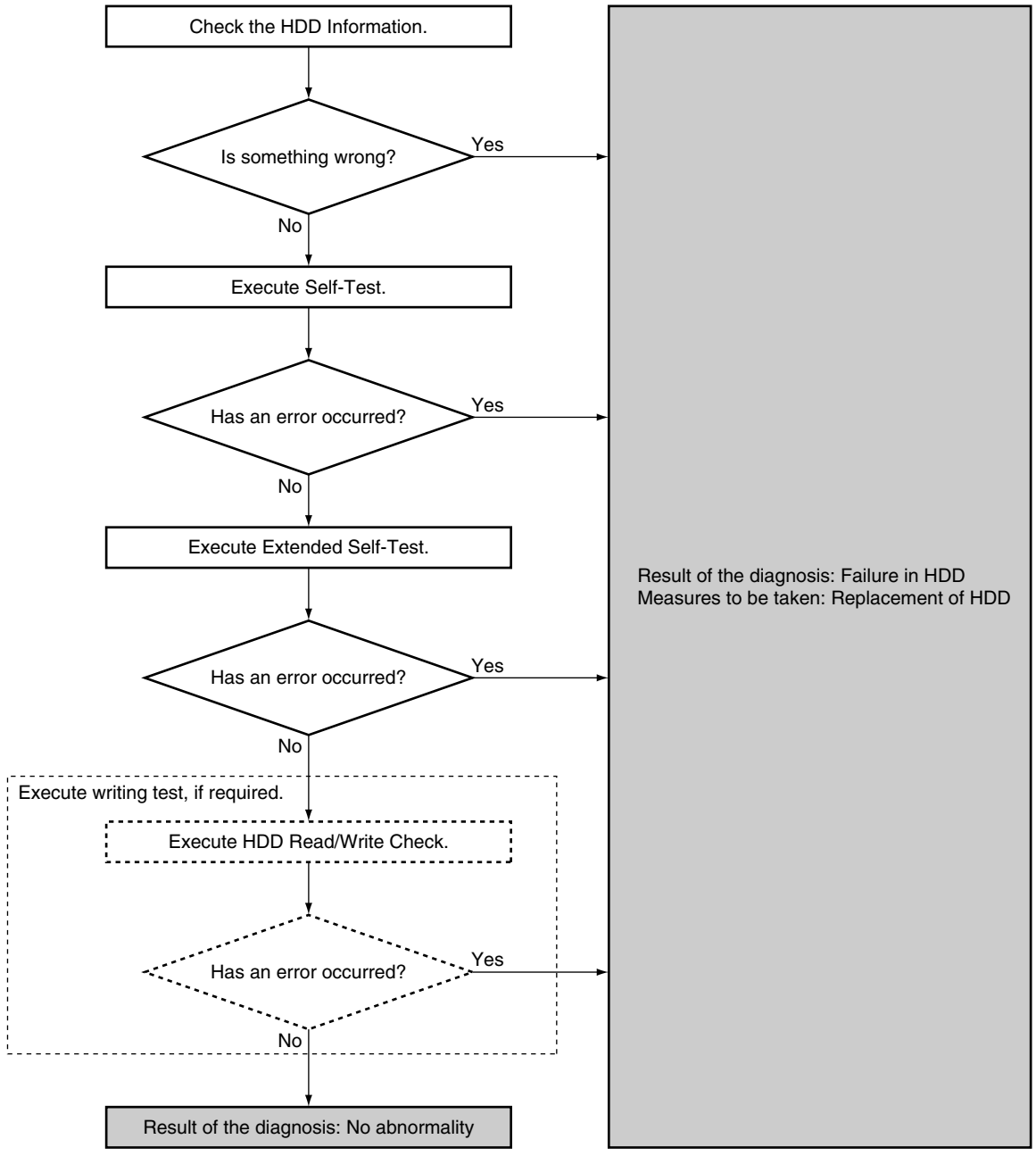
Purpose:
With use of the HDD-diagnostic program contained in the product itself, physical errors on the HDD can be diagnosed. Use this program to diagnose whether or not the HDD is in failure when one of the symptoms indicated below is recognized, or when a failure in the HDD is suspected.

Symptoms of failure in HDD:
(1) HDD Error
(2) Failure in HDD recording or playback
(3) HDD not recognized

Tool to be used:
Remote control unit for servicing (GGF1381)

1. Flow of HDD diagnosis

(1) Flowchart of HDD diagnosis



(2) Overview of the diagnosis items

HDD Information	This is a display for checking the HDD information, such as the model name of the HDD, continuous power-on time, authentication status, and results of the diagnosis on the end of service life.
SELF TEST	This is a simplified diagnosis for the HDD. A serious failure in the HDD can be detected with this test. Time required for testing: Approx. 60 sec.
EXTENDED SELF TEST	This is a reading test across all sectors of the HDD. Data recorded on the HDD will not be erased, because no writing operation is performed. Time required for testing: Approx. 2 hours/160 GB
HDD Read / Write Check	This is a writing, reading, and comparing test across all sectors of the HDD. **All data recorded on the HDD will be erased**, because all the data are to be overwritten. **Be sure to obtain your client's consent beforehand.** Time required for testing: Approx. 6.4 hours/160 GB

2. How to start or terminate the diagnostic program

How to start/terminate the diagnostic program

Use the remote control unit for servicing.

How to start: Press the "ESC", "CX", "0", and "1" keys simultaneously.

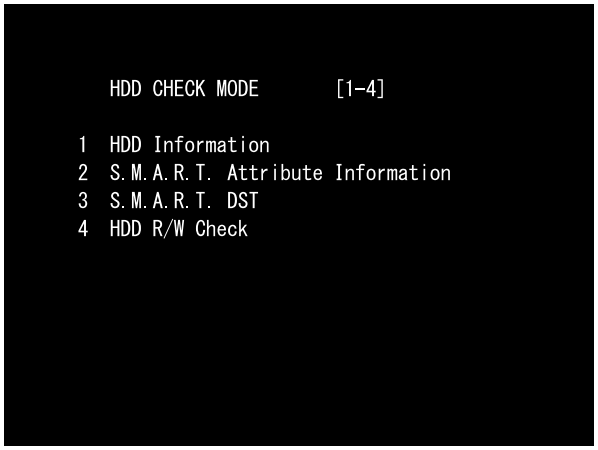
How to terminate: Press the "ESC" key.

Do NOT perform other operations on the unit while the HDD diagnosis is in progress. Although the diagnostic program is designed to function independently from the unit's functions, an operation on the unit during a diagnosis may cause a malfunction.

The status of the unit recommended during diagnosis is as follows: All stop, no timer recording (including auto-recording), and Input selection to L1-L3.

3. Diagnosis procedures

① Display the menu on the screen.
The menu indicated below is displayed when the diagnostic program is started. To enter each mode, press the corresponding key "1"-"4" on the remote control unit for servicing.



Tests to be executed
① HDD Information:
Check of the HDD information
② S.M.A.R.T. DST:
Executing a simplified test or a reading test of all data
③ HDD R/W Check:
Executing a writing/reading test of all data. All data on the HDD will be erased if this test is executed.

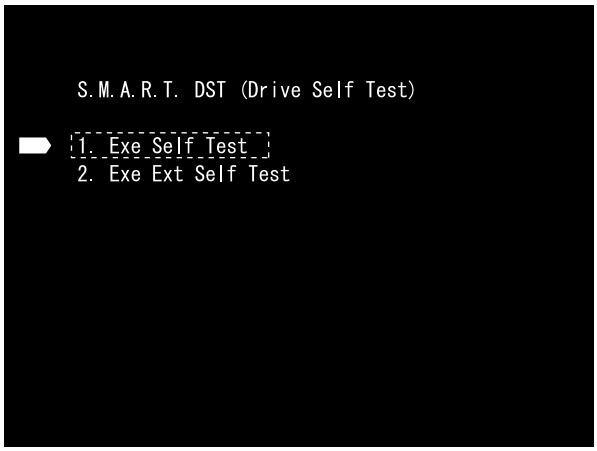
Note: "2. S.M.A.R.T. Attribute . . ." is not to be used.

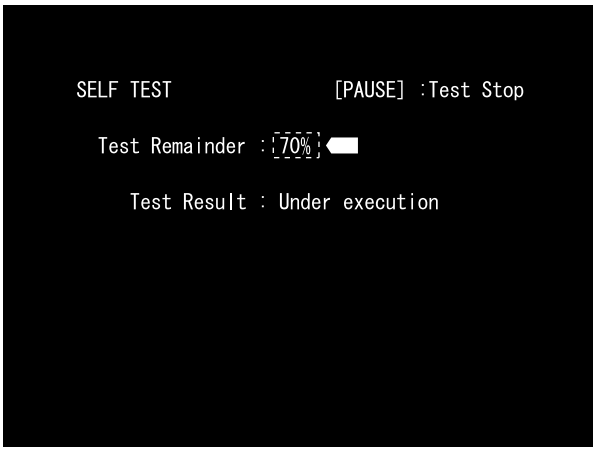
② Check the HDD information.
Press the "1" key on the remote control unit for servicing. Check the following data:
Model: Is the correct model name of the HDD displayed?
Recog. No: Is a positive value displayed?
SMART threshold: Is "not exceeded" displayed?

Detailed description
① Model:
For the correct model name, refer to the display of the unit.
② Recog. No:
Positive value: The HDD has been authenticated.
Negative value: The HDD has not been authenticated.
③ SMART threshold:
exceeded: The HDD has come to the end or near the end of its service life.
not exceeded: The HDD has not reached the end of its service life.

To return to the menu screen, press the "Clear" key.

③ Execute Self-Test.
Press the "3" key on the remote control unit for servicing while the menu screen is displayed.
When the following screen is displayed, press the "1" key to start the Self-Test.



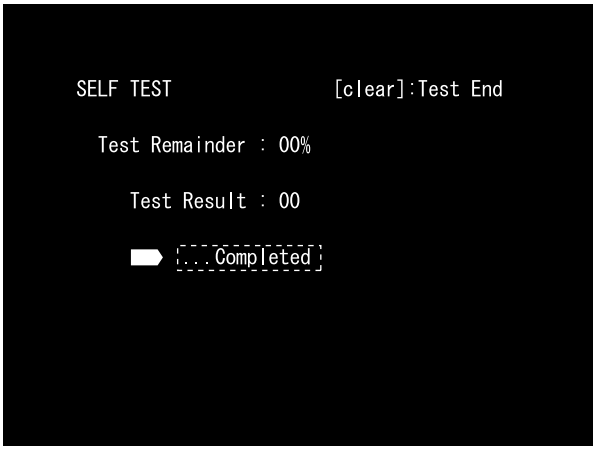


The progress of the test is displayed on the screen. The percentage remaining of the test is displayed on the screen, and the test is terminated when the percentage reaches 00%.
Check whether or not an error has occurred after the test is finished.

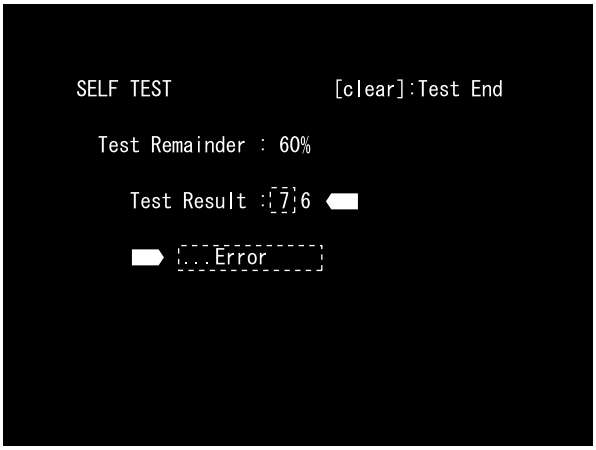
Diagnosis results
- Without an error: ". . . Completed" is displayed.
  Then, proceed to the Extended Self-Test.
- With an error: ". . . Error" is displayed. Look at the number in Test Result.
  If the place value for tens is 1 or 2, execute the Self-Test again.
  If it is from 3 to 7, the HDD must be replaced.

Note: If the result of the second test is the same, replacement of the HDD is required.

Example: No error

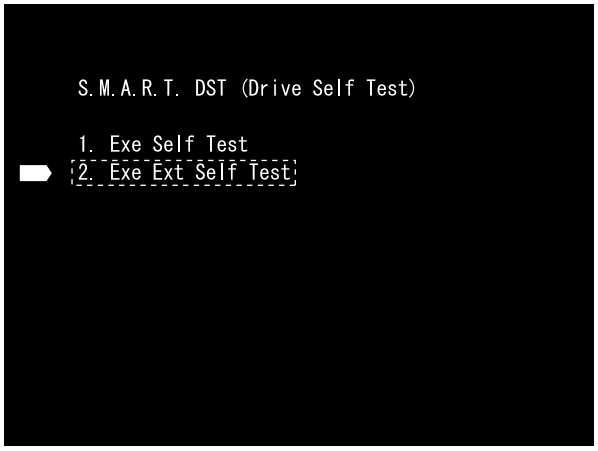


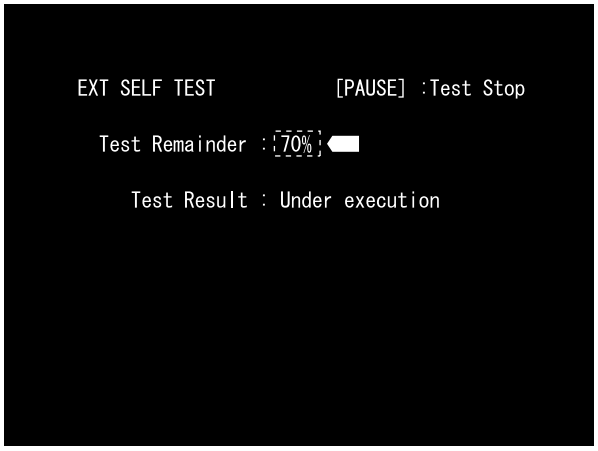
Example: With an error



To return to the menu screen, press the "Clear" key.

④ Execute the Ext (Extended) Self-Test.



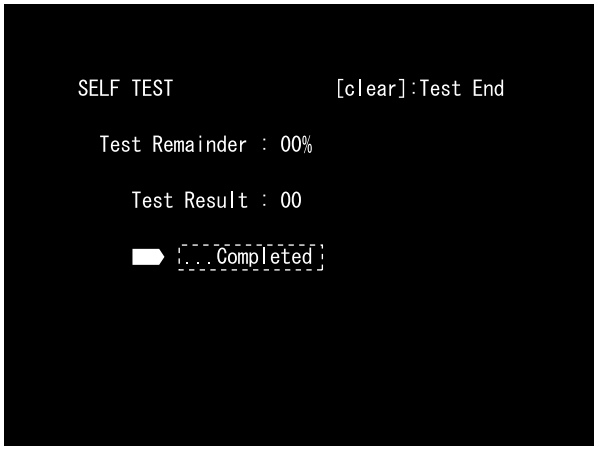


Press the "3" key while the menu screen is displayed, then the "2" key on the remote control unit for servicing. The Extended Self-Test starts. The percentage remaining of the test is displayed on the screen, and the test is terminated when the percentage reaches 00%. Check whether or not an error has occurred after the test is finished.

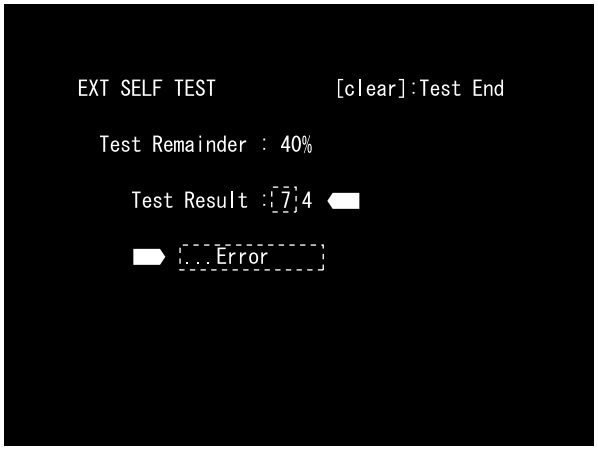
Diagnosis results
- Without an error: ". . . Completed" is displayed.
  If no error occurs up until this stage, HDD operations are normal except for writing operations.
  If the unit has a failure in HDD playback, a block other than the HDD may be in failure.
  If the unit's failure is in HDD recording, however, the next HDD Read/Write Check must be executed to test writing operations.
- With an error: ". . . Error" is displayed.
  Look at the number in Test Result.
  If the place value for tens is 1 or 2, execute the Ext Self-Test again.
  If it is from 3 to 7, the HDD must be replaced.

Note: If the result of the second test is the same, replacement of the HDD is required.

Example: No error

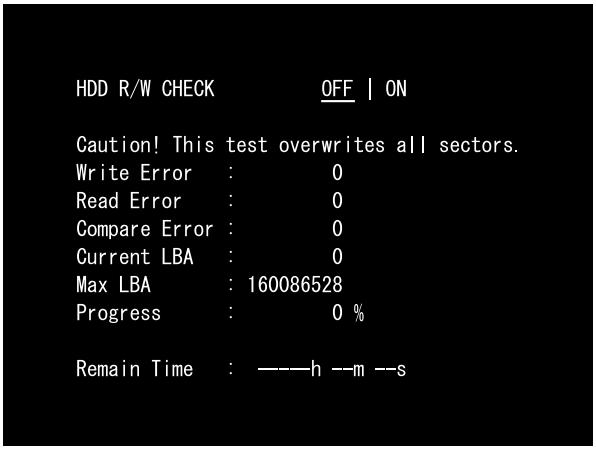


Example: With an error

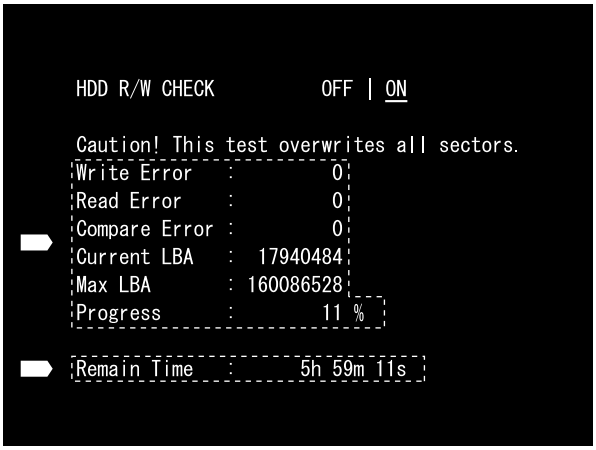


To return to the menu screen, press the "Clear" key.

⑤ Execute the HDD R/W Check.
Before executing this test, **be sure to obtain your client's consent for erasure of HDD data**.
Press the "4" key while the menu screen is displayed then the "SKIP ►►I" key to start the HDD R/W Check.
To stop executing the test (OFF) while it is in progress, press the "SKIP I◄◄" key.


HDD R/W CHECK OFF | ON
Caution! This test overwrites all sectors.
Write Error : 0
Read Error : 0
Compare Error : 0
Current LBA : 0
Max LBA : 160086528
Progress : 0 %
Remain Time : ----h --m --s

The display on the left indicates the progress of the test.
The percentage of the test progress is displayed on the screen, and the test is finished when the percentage reaches 100%.

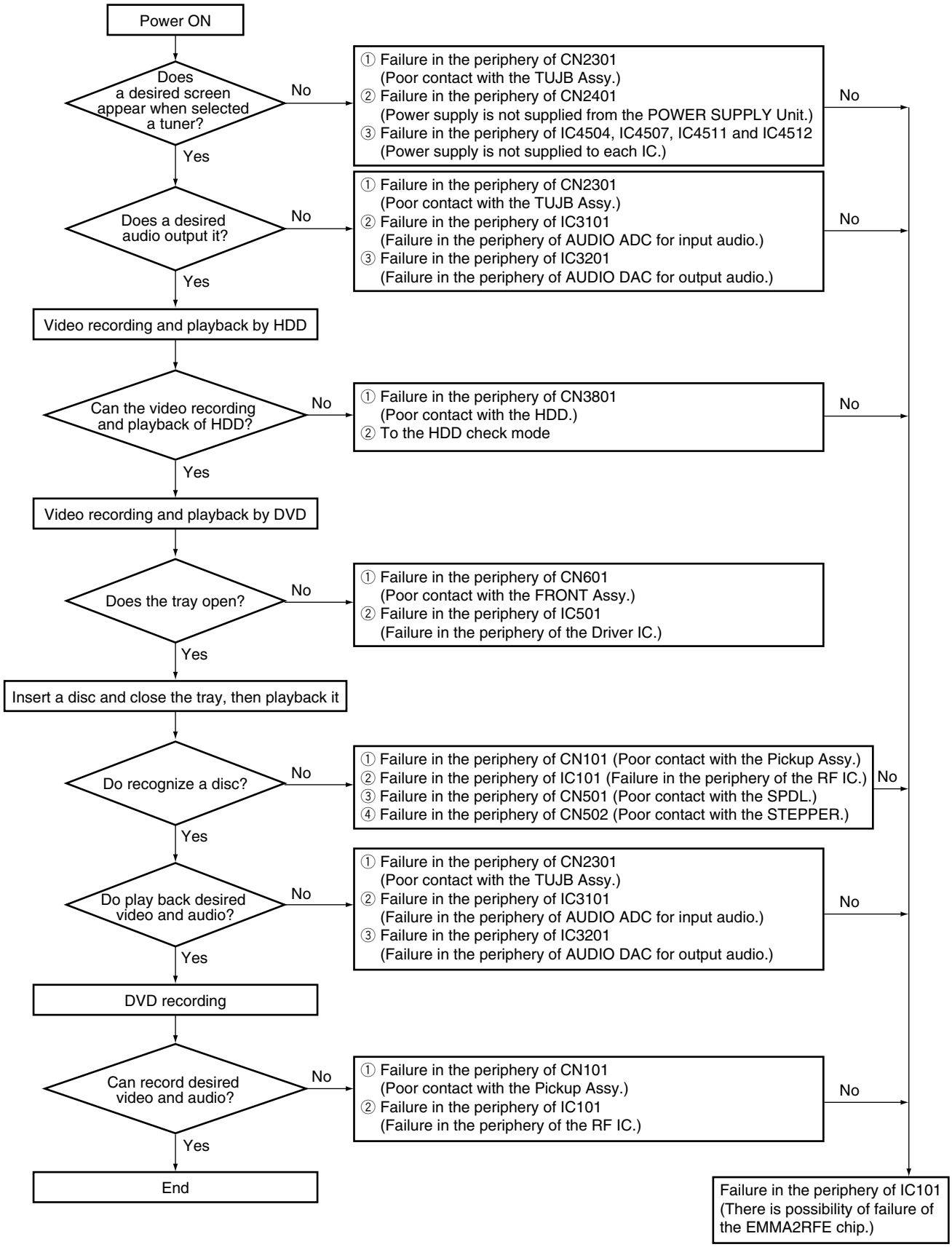

HDD R/W CHECK OFF | ON
Caution! This test overwrites all sectors.
Write Error : 0
Read Error : 0
Compare Error : 0
Current LBA : 17940484
Max LBA : 160086528
Progress : 11 %
Remain Time : 5h 59m 11s

Detailed description on each item on the screen
- Write Error: Number of write errors
- Read Error: Number of read errors
- Compare Error: Number of comparison errors
- Current LBA: The address during testing
- Max LBA: Highest address number of the HDD
- Progress: Percentage of test progress (%)
- Remain Time: Estimated time required for finishing the test across all sectors.
  Estimated time: 6.4 hours/160 GB

Diagnosis results
- If no error occurs in any of the Write/Read/Compare items, the HDD is in normal condition and is not required to be replaced. A block other than the HDD is in failure.
- If any error occurs, the HDD must be replaced.

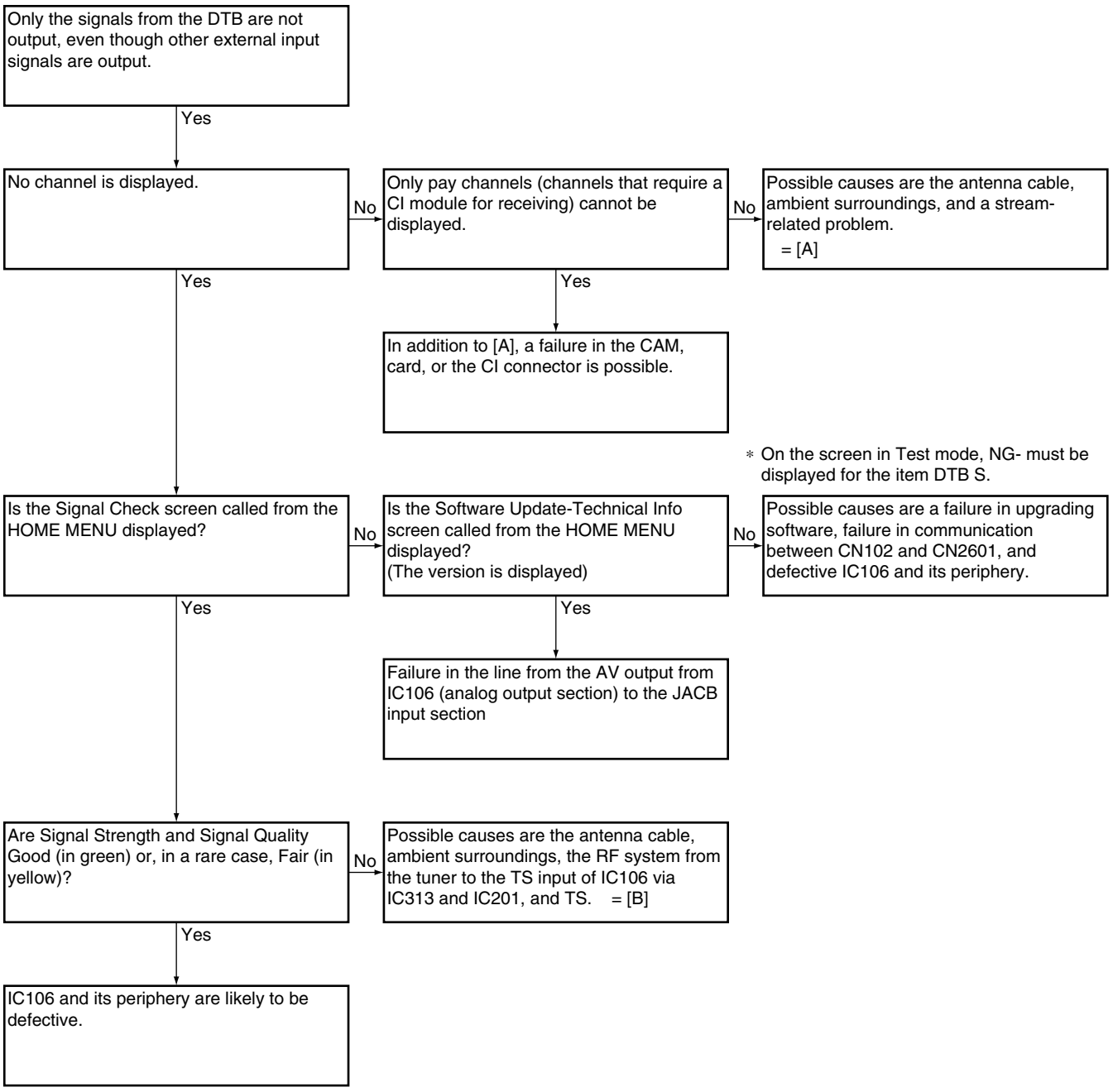
To terminate the diagnostic program, press the "ESC" key.

7.1.11 DIAGNOSIS OF THE MAIN ASSY


Power ON
Does a desired screen appear when selected a tuner?
No
① Failure in the periphery of CN2301 (Poor contact with the TUJB Assy.)
② Failure in the periphery of CN2401 (Power supply is not supplied from the POWER SUPPLY Unit.)
③ Failure in the periphery of IC4504, IC4507, IC4511 and IC4512 (Power supply is not supplied to each IC.)
No
Yes
Does a desired audio output it?
No
① Failure in the periphery of CN2301 (Poor contact with the TUJB Assy.)
② Failure in the periphery of IC3101 (Failure in the periphery of AUDIO ADC for input audio.)
③ Failure in the periphery of IC3201 (Failure in the periphery of AUDIO DAC for output audio.)
No
Yes
Video recording and playback by HDD
Can the video recording and playback of HDD?
No
① Failure in the periphery of CN3801 (Poor contact with the HDD.)
② To the HDD check mode
No
Yes
Video recording and playback by DVD
Does the tray open?
No
① Failure in the periphery of CN601 (Poor contact with the FRONT Assy.)
② Failure in the periphery of IC501 (Failure in the periphery of the Driver IC.)
Yes
Insert a disc and close the tray, then playback it
Do recognize a disc?
No
① Failure in the periphery of CN101 (Poor contact with the Pickup Assy.)
② Failure in the periphery of IC101 (Failure in the periphery of the RF IC.)
③ Failure in the periphery of CN501 (Poor contact with the SPDL.)
④ Failure in the periphery of CN502 (Poor contact with the STEPPER.)
No
Yes
Do play back desired video and audio?
No
① Failure in the periphery of CN2301 (Poor contact with the TUJB Assy.)
② Failure in the periphery of IC3101 (Failure in the periphery of AUDIO ADC for input audio.)
③ Failure in the periphery of IC3201 (Failure in the periphery of AUDIO DAC for output audio.)
No
Yes
DVD recording
Can record desired video and audio?
No
① Failure in the periphery of CN101 (Poor contact with the Pickup Assy.)
② Failure in the periphery of IC101 (Failure in the periphery of the RF IC.)
No
Yes
End
Failure in the periphery of IC101 (There is possibility of failure of the EMMA2RFE chip.)

7.1.12 DIAGNOSIS OF THE DTBR ASSY

The DTB (Digital Terrestrial Board) does not function

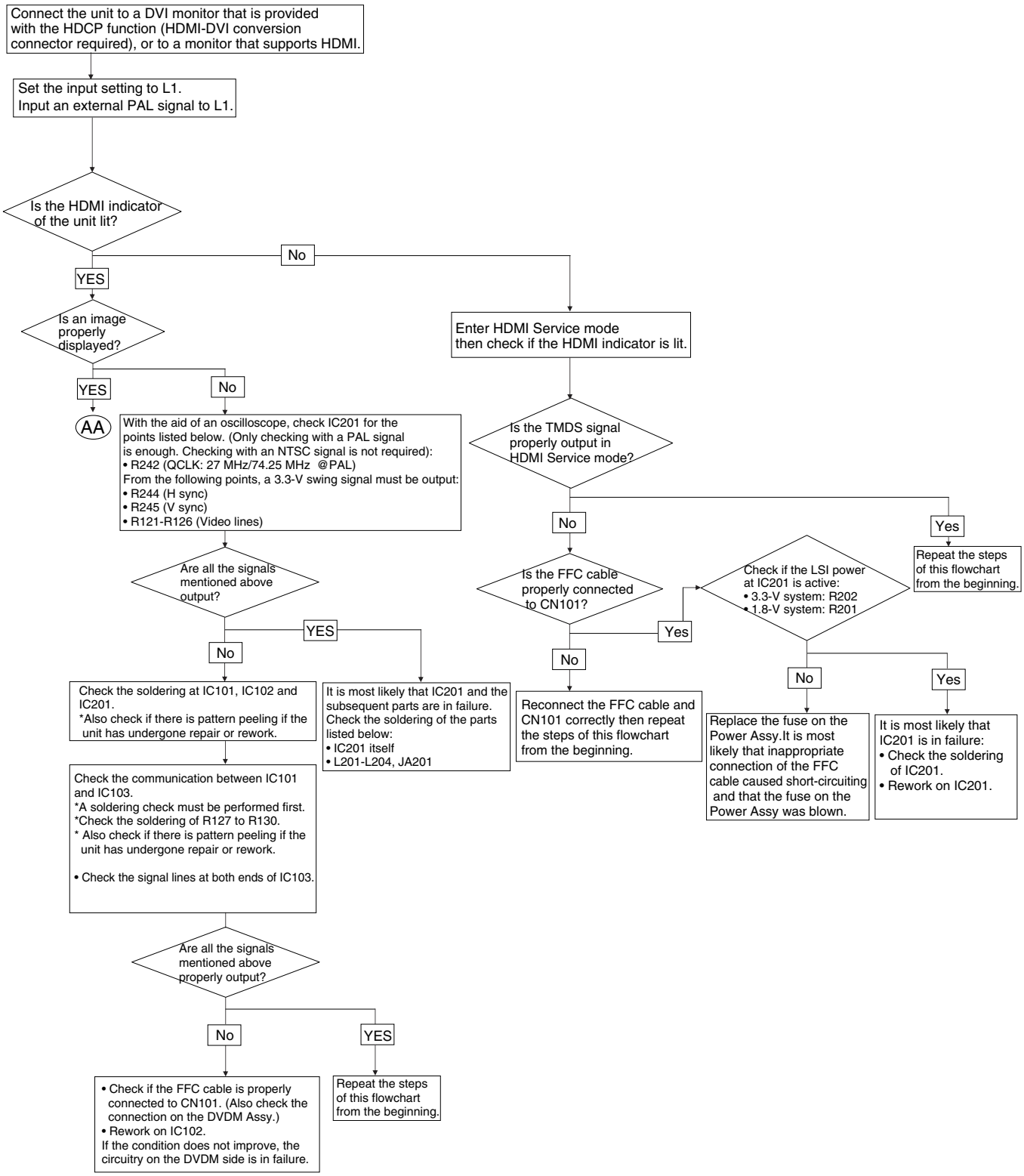

Only the signals from the DTB are not output, even though other external input signals are output.
Yes
No channel is displayed.
No
Only pay channels (channels that require a CI module for receiving) cannot be displayed.
No
Possible causes are the antenna cable, ambient surroundings, and a stream-related problem.
= [A]
Yes
Yes
In addition to [A], a failure in the CAM, card, or the CI connector is possible.
* On the screen in Test mode, NG- must be displayed for the item DTB S.
Is the Signal Check screen called from the HOME MENU displayed?
No
Is the Software Update-Technical Info screen called from the HOME MENU displayed?
(The version is displayed)
No
Possible causes are a failure in upgrading software, failure in communication between CN102 and CN2601, and defective IC106 and its periphery.
Yes
Yes
Failure in the line from the AV output from IC106 (analog output section) to the JACB input section
Are Signal Strength and Signal Quality Good (in green) or, in a rare case, Fair (in yellow)?
No
Possible causes are the antenna cable, ambient surroundings, the RF system from the tuner to the TS input of IC106 via IC313 and IC201, and TS. = [B]
Yes
IC106 and its periphery are likely to be defective.

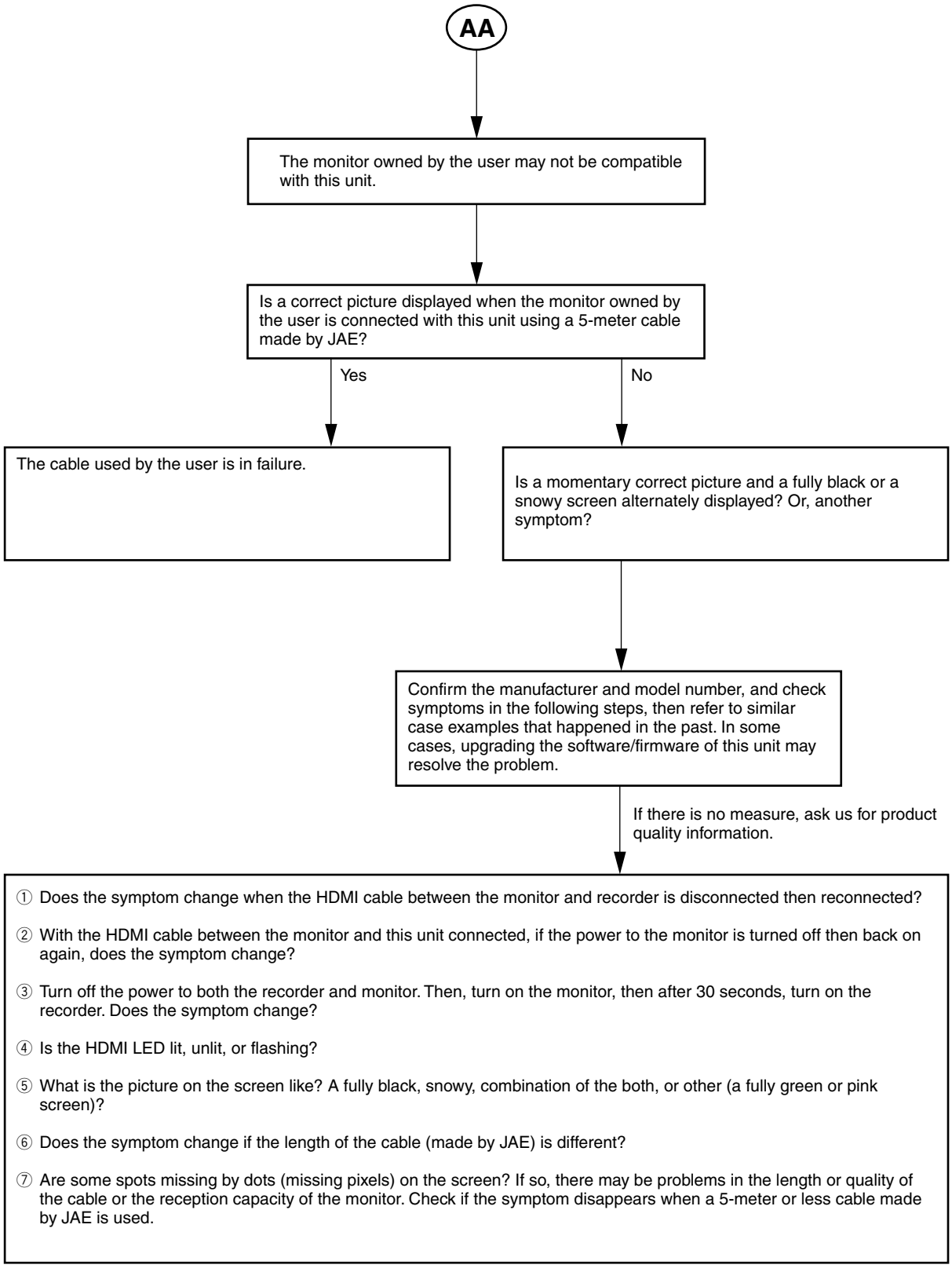
- Except when the local regulator is in failure, a power failure (blown a fuse, etc.) makes other input systems abnormal.
- If mosaic images are often displayed, check the items in [B].
- If the audio from only the DTB is defective, check the items in [B] and the line from the audio output from IC106 (analog output section) to the JACB input section.

7.1.13 DIAGNOSIS OF THE HDMIB ASSY

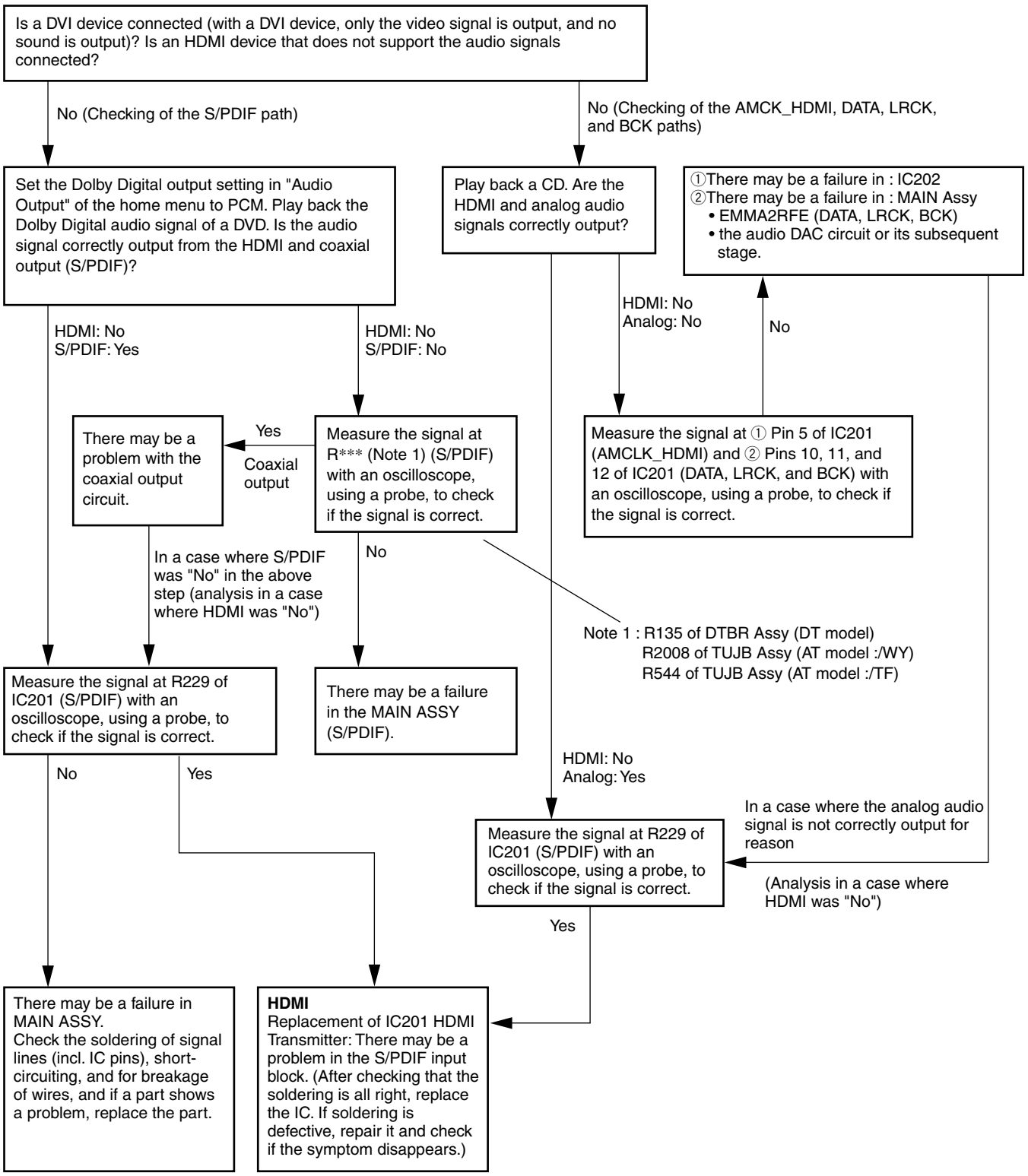
*This flowchart shows how to confirm the output from the HDMI block on the basis that an external input signal to the L1 connector is through-output from the analog output connector properly.

1. In a case when only the HDMI video is not outputted


Connect the unit to a DVI monitor that is provided with the HDCP function (HDMI-DVI conversion connector required), or to a monitor that supports HDMI.
Set the input setting to L1.
Input an external PAL signal to L1.
Is the HDMI indicator of the unit lit?
No
YES
Is an image properly displayed?
YES
No
AA
With the aid of an oscilloscope, check IC201 for the points listed below. (Only checking with a PAL signal is enough. Checking with an NTSC signal is not required):
• R242 (QCLK: 27 MHz/74.25 MHz @PAL)
From the following points, a 3.3-V swing signal must be output:
• R244 (H sync)
• R245 (V sync)
• R121-R126 (Video lines)
Are all the signals mentioned above output?
YES
No
Check the soldering at IC101, IC102 and IC201.
*Also check if there is pattern peeling if the unit has undergone repair or rework.
It is most likely that IC201 and the subsequent parts are in failure. Check the soldering of the parts listed below:
• IC201 itself
• L201-L204, JA201
Check the communication between IC101 and IC103.
*A soldering check must be performed first.
*Check the soldering of R127 to R130.
* Also check if there is pattern peeling if the unit has undergone repair or rework.
• Check the signal lines at both ends of IC103.
Are all the signals mentioned above properly output?
No
YES
• Check if the FFC cable is properly connected to CN101. (Also check the connection on the DVDM Assy.)
• Rework on IC102.
If the condition does not improve, the circuitry on the DVDM side is in failure.
Repeat the steps of this flowchart from the beginning.
Enter HDMI Service mode then check if the HDMI indicator is lit.
Is the TMDS signal properly output in HDMI Service mode?
No
Yes
Repeat the steps of this flowchart from the beginning.
Is the FFC cable properly connected to CN101?
Yes
No
Reconnect the FFC cable and CN101 correctly then repeat the steps of this flowchart from the beginning.
Check if the LSI power at IC201 is active:
• 3.3-V system: R202
• 1.8-V system: R201
No
Yes
Replace the fuse on the Power Assy.It is most likely that inappropriate connection of the FFC cable caused short-circuiting and that the fuse on the Power Assy was blown.
It is most likely that IC201 is in failure:
• Check the soldering of IC201.
• Rework on IC201.


AA
The monitor owned by the user may not be compatible with this unit.
Is a correct picture displayed when the monitor owned by the user is connected with this unit using a 5-meter cable made by JAE?
Yes
No
The cable used by the user is in failure.
Is a momentary correct picture and a fully black or a snowy screen alternately displayed? Or, another symptom?
Confirm the manufacturer and model number, and check symptoms in the following steps, then refer to similar case examples that happened in the past. In some cases, upgrading the software/firmware of this unit may resolve the problem.
If there is no measure, ask us for product quality information.
① Does the symptom change when the HDMI cable between the monitor and recorder is disconnected then reconnected?
② With the HDMI cable between the monitor and this unit connected, if the power to the monitor is turned off then back on again, does the symptom change?
③ Turn off the power to both the recorder and monitor. Then, turn on the monitor, then after 30 seconds, turn on the recorder. Does the symptom change?
④ Is the HDMI LED lit, unlit, or flashing?
⑤ What is the picture on the screen like? A fully black, snowy, combination of the both, or other (a fully green or pink screen)?
⑥ Does the symptom change if the length of the cable (made by JAE) is different?
⑦ Are some spots missing by dots (missing pixels) on the screen? If so, there may be problems in the length or quality of the cable or the reception capacity of the monitor. Check if the symptom disappears when a 5-meter or less cable made by JAE is used.

2. In a case when only the HDMI audio is not outputted


Is a DVI device connected (with a DVI device, only the video signal is output, and no sound is output)? Is an HDMI device that does not support the audio signals connected?
No (Checking of the S/PDIF path)
No (Checking of the AMCK_HDMI, DATA, LRCK, and BCK paths)
Set the Dolby Digital output setting in "Audio Output" of the home menu to PCM. Play back the Dolby Digital audio signal of a DVD. Is the audio signal correctly output from the HDMI and coaxial output (S/PDIF)?
Play back a CD. Are the HDMI and analog audio signals correctly output?
①There may be a failure in : IC202
②There may be a failure in : MAIN Assy
• EMMA2RFE (DATA, LRCK, BCK)
• the audio DAC circuit or its subsequent stage.
HDMI: No
S/PDIF: Yes
HDMI: No
S/PDIF: No
HDMI: No
Analog: No
No
There may be a problem with the coaxial output circuit.
Yes
Coaxial output
Measure the signal at R*** (Note 1) (S/PDIF) with an oscilloscope, using a probe, to check if the signal is correct.
Measure the signal at ① Pin 5 of IC201 (AMCLK_HDMI) and ② Pins 10, 11, and 12 of IC201 (DATA, LRCK, and BCK) with an oscilloscope, using a probe, to check if the signal is correct.
In a case where S/PDIF was "No" in the above step (analysis in a case where HDMI was "No")
No
Note 1 : R135 of DTBR Assy (DT model)
R2008 of TUJB Assy (AT model :/WY)
R544 of TUJB Assy (AT model :/TF)
Measure the signal at R229 of IC201 (S/PDIF) with an oscilloscope, using a probe, to check if the signal is correct.
There may be a failure in the MAIN ASSY (S/PDIF).
HDMI: No
Analog: Yes
In a case where the analog audio signal is not correctly output for reason
(Analysis in a case where HDMI was "No")
Measure the signal at R229 of IC201 (S/PDIF) with an oscilloscope, using a probe, to check if the signal is correct.
No
Yes
Yes
There may be a failure in MAIN ASSY.
Check the soldering of signal lines (incl. IC pins), short-circuiting, and for breakage of wires, and if a part shows a problem, replace the part.
HDMI
Replacement of IC201 HDMI Transmitter: There may be a problem in the S/PDIF input block. (After checking that the soldering is all right, replace the IC. If soldering is defective, repair it and check if the symptom disappears.)

7.1.14 NOTE ON REPLACEMENT OF THE SDRAM

Note when replacing the SDRAM

When replacement of the SDRAM (IC1201 or IC1221) on the MAIN Assy is required, identify the manufacturer of the SDRAM.
If the SDRAM that needs replacement was manufactured by HYNIX, both IC1201 and IC1221 must be replaced at the same time.
SDRAMs for service are manufactured by SAMSUNG.

• How to identify the manufacturer

Confirm the name of the manufacturer stamped on the surface of the part.

By HYNIX (replacement of both SDRAMs required)

By SAMSUNG (replacement of only the defective SDRAM possible)

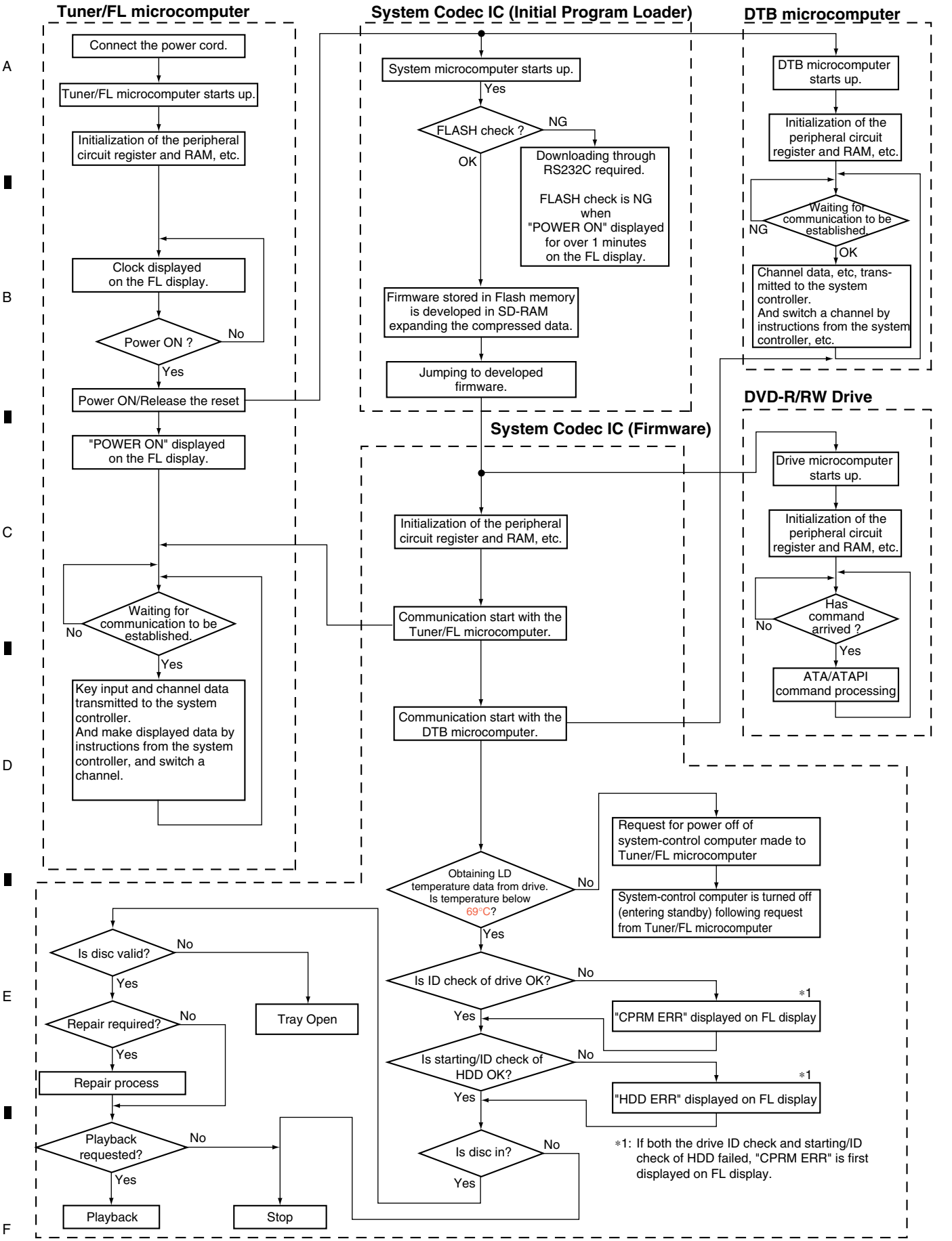
• Measures to be taken

① If the SDRAM that needs replacement was manufactured by HYNIX:
Replace both IC1201 and IC1221 at the same time.
② If the SDRAM that needs replacement was manufactured by SAMSUNG:
Replacement of only the defective SDRAM (IC1201 or IC1221) is possible.

• Possible malfunctions

If SDRAMs made by different manufacturers are mounted on the MAIN Assy, the following malfunctions may occur:
① The power does not come on.
② High-speed dubbing disabled
③ Other malfunctions related to the SDRAM

7.1.15 SETUP SEQUENCE


Tuner/FL microcomputer
System Codec IC (Initial Program Loader)
DTB microcomputer
DVD-R/RW Drive
System Codec IC (Firmware)
Connect the power cord.
Tuner/FL microcomputer starts up.
Initialization of the peripheral circuit register and RAM, etc.
Clock displayed on the FL display.
Power ON ?
No
Yes
Power ON/Release the reset
"POWER ON" displayed on the FL display.
Waiting for communication to be established.
No
Yes
Key input and channel data transmitted to the system controller.
And make displayed data by instructions from the system controller, and switch a channel.
System microcomputer starts up.
Yes
FLASH check ?
NG
OK
Downloading through RS232C required.
FLASH check is NG when "POWER ON" displayed for over 1 minutes on the FL display.
Firmware stored in Flash memory is developed in SD-RAM expanding the compressed data.
Jumping to developed firmware.
Initialization of the peripheral circuit register and RAM, etc.
Communication start with the Tuner/FL microcomputer.
Communication start with the DTB microcomputer.
DTB microcomputer starts up.
Initialization of the peripheral circuit register and RAM, etc.
Waiting for communication to be established.
NG
OK
Channel data, etc, transmitted to the system controller.
And switch a channel by instructions from the system controller, etc.
Drive microcomputer starts up.
Initialization of the peripheral circuit register and RAM, etc.
Has command arrived ?
No
Yes
ATA/ATAPI command processing
Obtaining LD temperature data from drive. Is temperature below 69°C?
No
Yes
Request for power off of system-control computer made to Tuner/FL microcomputer
System-control computer is turned off (entering standby) following request from Tuner/FL microcomputer
Is ID check of drive OK?
No
Yes
*1
"CPRM ERR" displayed on FL display
Is starting/ID check of HDD OK?
No
Yes
*1
"HDD ERR" displayed on FL display
Is disc in?
No
Yes
*1: If both the drive ID check and starting/ID check of HDD failed, "CPRM ERR" is first displayed on FL display.
Is disc valid?
No
Yes
Tray Open
Repair required?
No
Yes
Repair process
Playback requested?
No
Yes
Playback
Stop

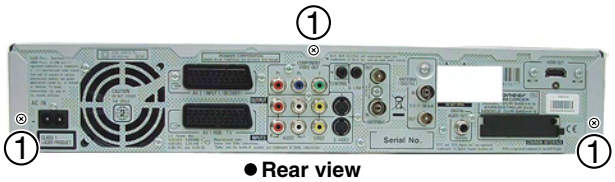
7.1.16 DISASSEMBLY

Note 1: Do NOT look directly into the pickup lens. The laser beam may cause eye injury.
Note 2: Even if the unit shown in the photos and illustrations in this manual may differ from your product, the procedures described here are common.
Note 3: For performing the diagnosis shown below, the following jigs for service is required:
- Emergency disc ejection rod (GGF1529)
- Jig cable for service (VKP2291)
- Extension board (GGF1533 (A)), (GGF1533 (B)) + Extension cable (GGD1437)

Diagnosis

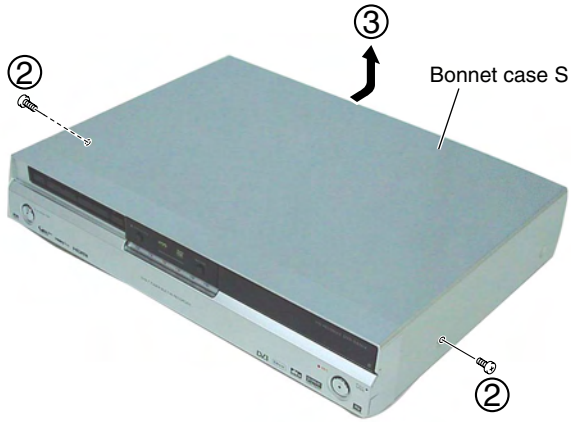
1 Bonnet Case S

① Remove the three screws.



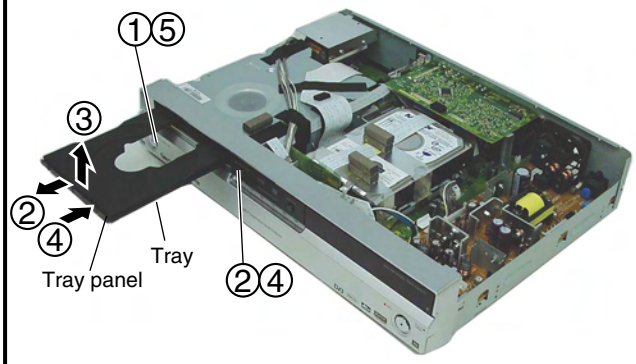
● **Rear view**

② Remove the two screws.
③ Remove the bonnet case S.



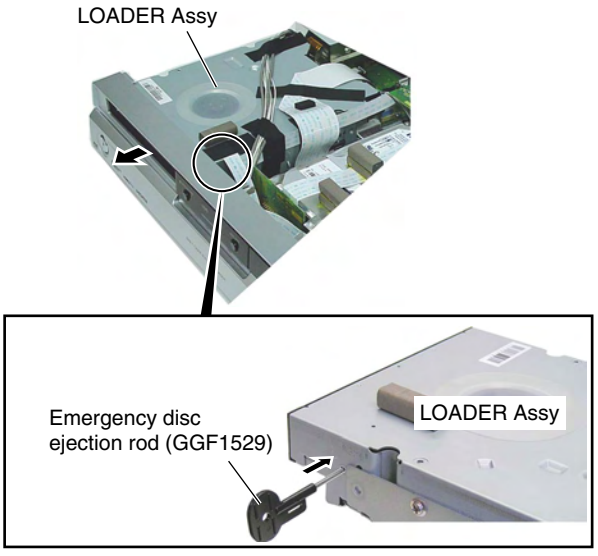
2 Tray Panel

① Press the ⏻ STANDBY/ON button to turn on the power.
② Press the ⏏ OPEN/CLOSE button to open the tray.
③ Remove the tray panel.
④ Press the ⏏ OPEN/CLOSE button to close the tray.
⑤ Press the ⏻ STANDBY/ON button to turn off the power.



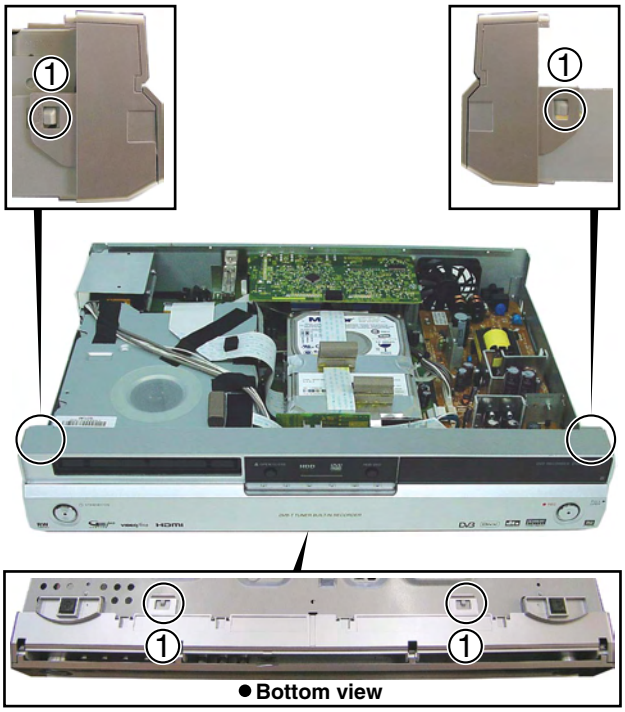
● **How to open the tray when the power cannot be turned on**

When the tray cannot be opened because the power cannot be turned on, it can be opened using the emergency disc ejection rod (GGF1529). (A long, thin rod about 1 mm in diameter can be used in place of the rod.)



3 Front Panel Section

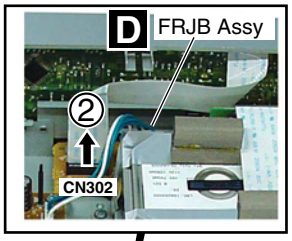
① Unhook the four hooks.

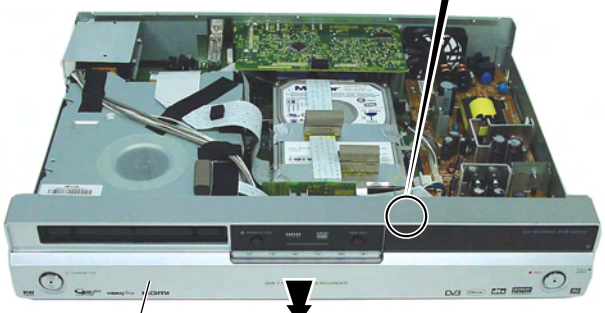


● Bottom view

② Disconnect the one flexible cable.

③ Remove the front panel section.



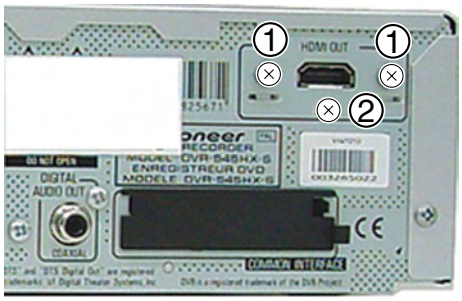


Front panel section

4 HDMIB Assy

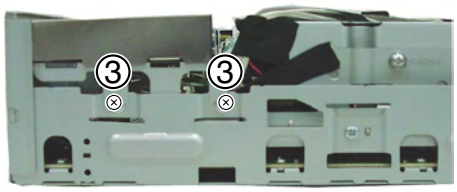
① Remove the two screws.

② Remove the one screws.

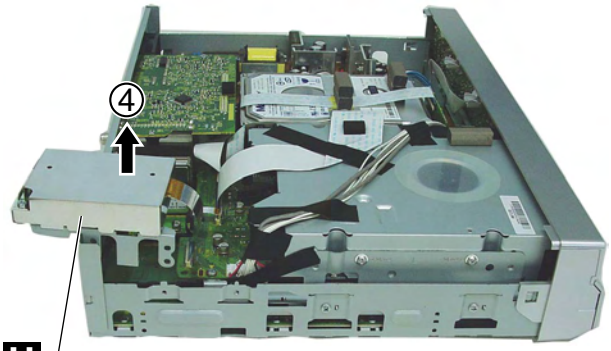


● Rear view

③ Remove the two screws.



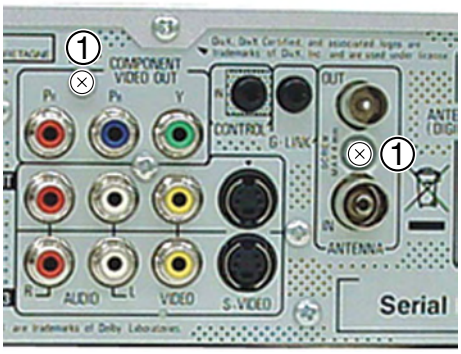
④ Remove the HDMIB Assy.
(Disconnect cables, as required.)



HDMIB Assy

5 TUNB Assy

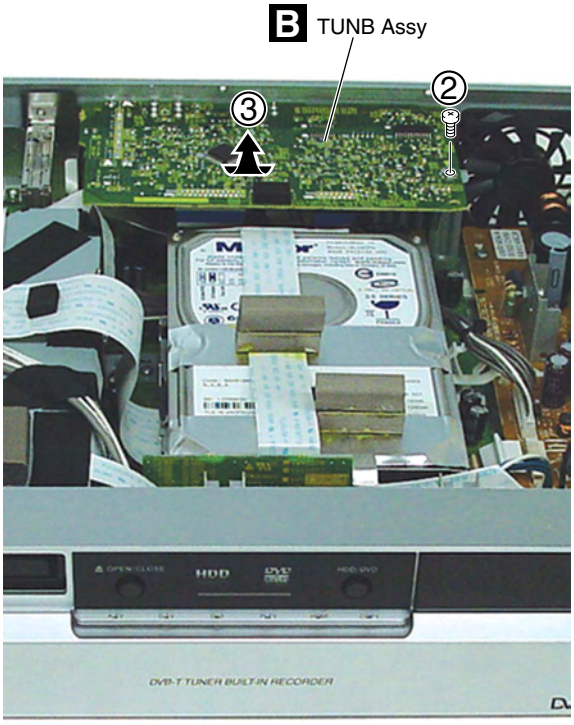
① Remove the two screws.



● Rear view

② Remove the one screw.

③ Remove the TUNB Assy.



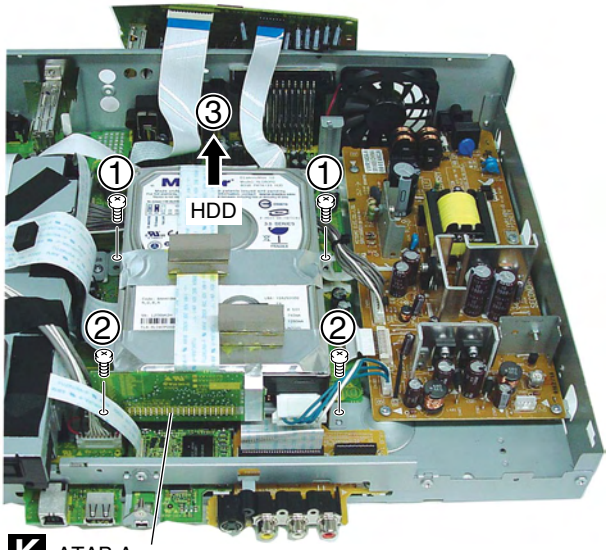
6 HDD and LOADER Assy

• HDD

① Remove the two screws.

② Remove the two screws.

③ Remove the HDD with the ATAB Assy and the HDD stay. (Disconnect cables, as required.)

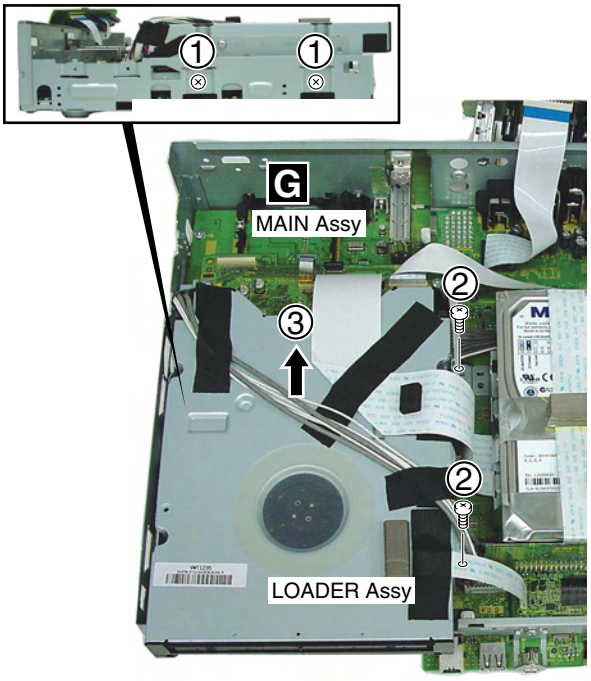


• LOADER Assy

① Remove the two screws.

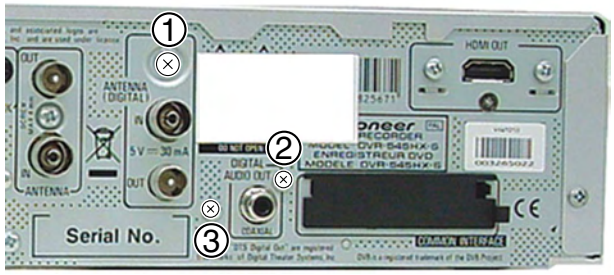
② Remove the two screws.

③ Remove the LOADER Assy with the writer stays L and R. (Disconnect cables, as required.)



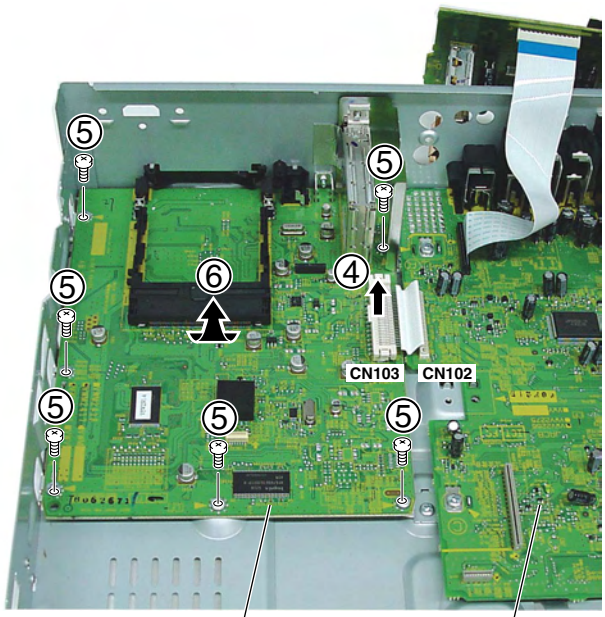
7 DTBR Assy

① Remove the one screw.
② Remove the one screw.
③ Remove the one screw.



● **Rear view**

④ Disconnect the connector.
⑤ Remove the six screws.
⑥ Remove the DTBR Assy.

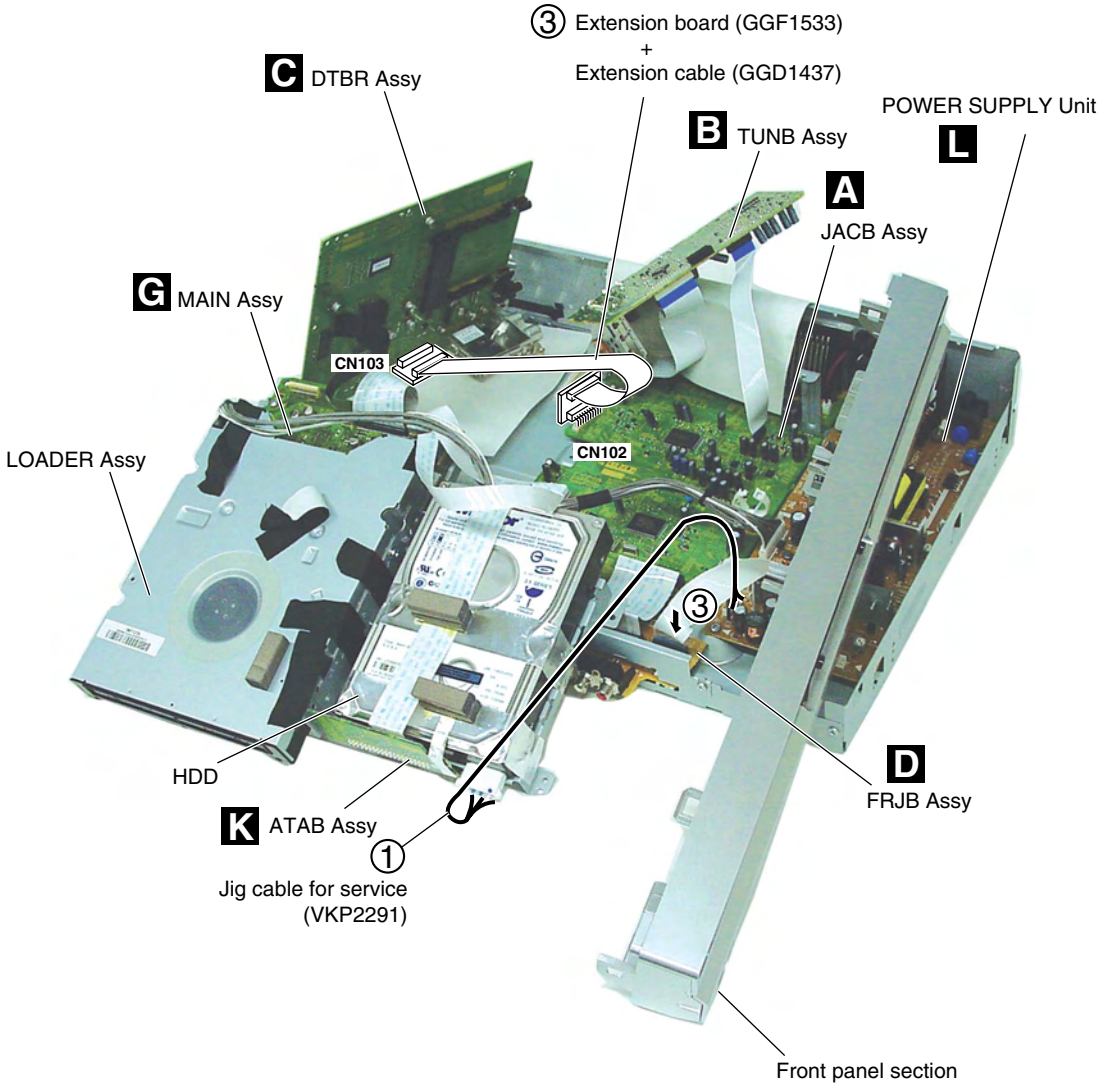


C DTBR Assy **A** JACB Assy

8 Diagnosis

① Connect the jig cable for service.
② Connect the extension boards and extension cable.
③ Reassembling the front panel section.
④ Arrange the unit as shown in the photo below.

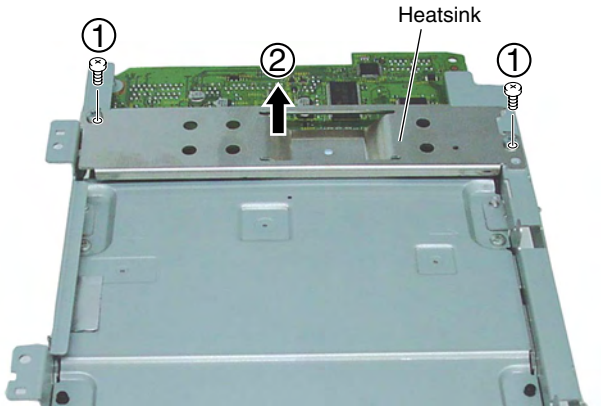
Diagnosis



Access to the MAIN Assy, Cleanning the Pickup Lens

• Heatsink

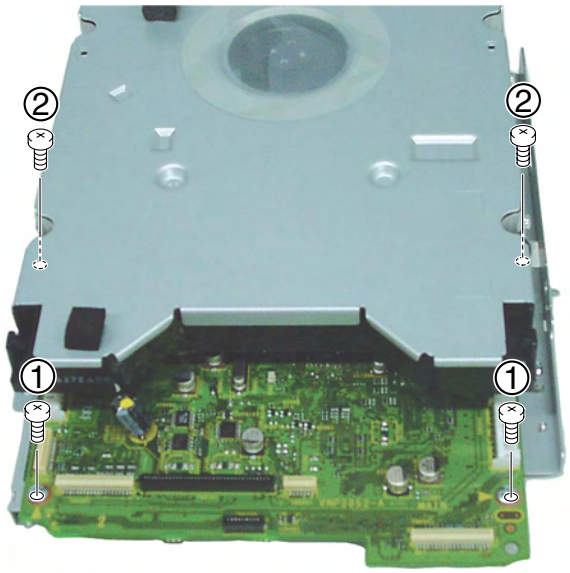
① Remove the two screws.
② Remove the heatsink.



● Bottom view

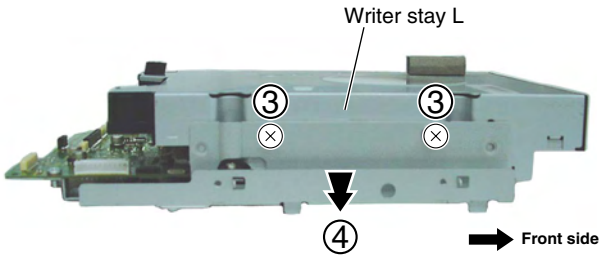
• Writer Stay L and R

① Remove the two screws.
② Remove the two screws.

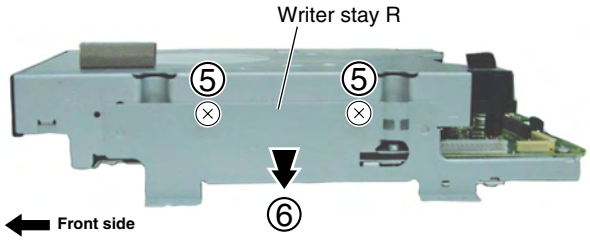


● Rear view

③ Remove the two screws.
④ Remove the writer stay L.



⑤ Remove the two screws.
⑥ Remove the writer stay R.

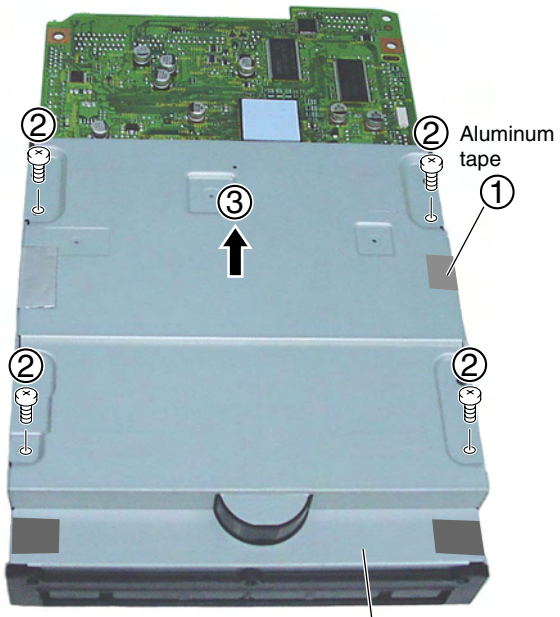


• Low Case U11 and UP Case S

① Remove the aluminum tape 25 × 25.

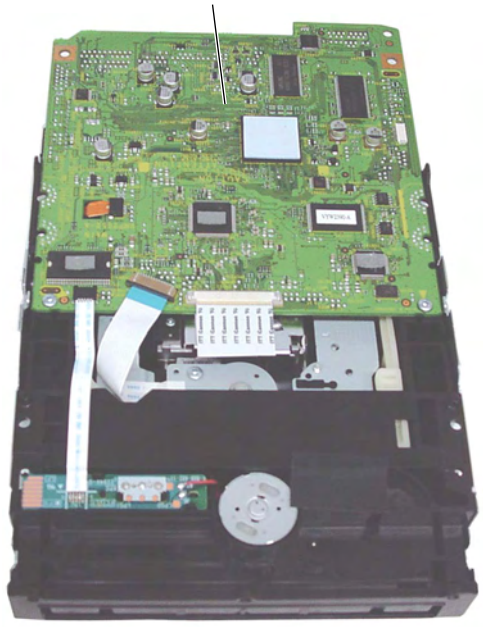
② Remove the four screws.

③ Remove the low case U11.



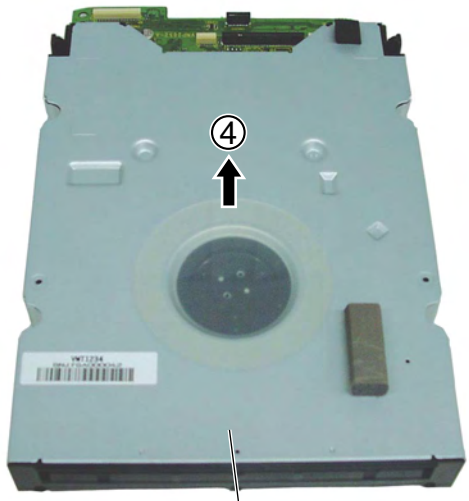
● **Bottom view**

Low case U11



● **Bottom view**

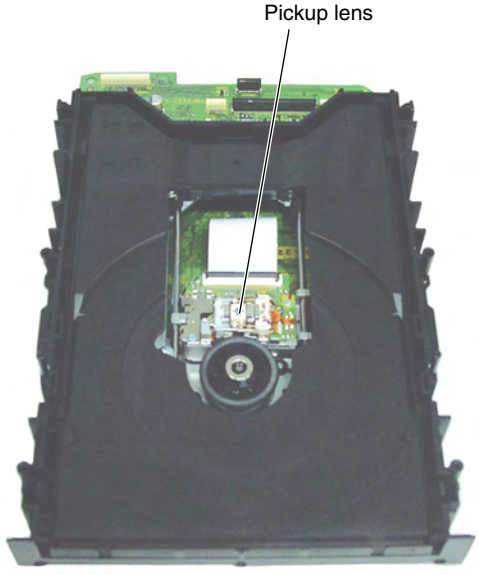
④ Remove the UP case S.



UP case S

Before shipment, be sure to clean the pickup lens, using the following cleaning materials:

Cleaning liquid : GEM1004
Cleaning paper : GED-008



7.2 IC

• The information shown in the list is basic information and may not correspond exactly to that shown in the schematic diagrams.

● **List of IC**

PMC015A8, UPD61272F1-107KA3A, AK5359ET, BH7236AF, UPD6110GM-100UEVA, STV0361L,TC7WB125FK, UPC3221GV, MM1689FH, TDOTG242-0F0C8, BD6517F, UPD72893BF1-FN3, CD0041AF

■ PMC015A8 (JACB ASSY : IC101)

• TUNER Microcomputer

● **Pin Function**

No.	Mark	Pin Name	I/O	Pin Function
1	PA3/SO8	FLDATA	O	Communication line with FL driver From tuner controller to FL driver
2	PA4/SI8/SB8	FLSTB	O	Communication strobe signal with FL driver
3	PA5/SCK8	FLCLK	O	Communication clock with FL driver
4	P70/INT0/T0LCP	WDT	I	WDT for microcomputer runaway detection RC is external connection. H: Forced reset
5	P71/INT1/T0HCP	ACDET	I	Existence detection of AC power Level interrupt
6	P72/INT2/T0IN/T0LCP	HS_MTOT	I	System controller communication handshake From system controller to Tuner controller
7	P73/INT3/T0IN/T0HCP	IR	I	Pulse input of the remote control unit
8	RES#	XTRESET	I	Reset input
9	XT1	XT1	I	Sub clock connection 32.768kHz
10	XT2	XT2	O	Sub clock connection
11	VSS1	GND	–	Ground
12	CF1	CF1	I	Main clock connection 15MHz
13	CF2	CF2	O	Main clock connection
14	VDD1	VDD1	–	Power supply
15	P80/AN0	MODEL1	AI	Input 1 for destination judgment
16	P81/AN1	MODEL2	AI	Input 2 for destination judgment
17	P82/AN2	KEY1	AI	Main unit key input 1
18	P83/AN3	KEY2	AI	Main unit key input 2
19	P84/AN4	KEY3	AI	Main unit key input 3
20	P85/AN5	AGC	AI	AGC voltage input from the tuner
21	P86/AN6	BATTERY	AI	Input for battery voltage check It is not used, but pull-up is necessary.
22	P87/AN7	FUNC	AI	SCART Function signal input
23	P10/SO0	SDET3	I	Plug detection of S terminal 3
24	P11/SI0/SB0	SDET2	I	Plug detection of S terminal 2
25	P12/SCK0	SDET1	I	Plug detection of S terminal 1 (Not used)
26	P13/SO1	AVLOUT	O	AV.Link output signal Negative logic Reverse on the SCART terminal
27	P14/SI1/SB1	SDA	O/D	IIC communication (data)
28	P15/SCK1	SCL	O/D	IIC communication (clock)
29	P16/T1PWML	XSYSRST	O	IC reset signal of whole system
30	P17/T1PWMH/BUZ	TUDET	I	The old and the new distinction of the tuner pack L: New tuner, H: Old tuner
31	PE0/AN12	MUTEV	O	Not used
32	PE1/AN13	NC	I	
33	PE2/AN14	AMUTE2	O	Audio mute signal of output stage Negative logic H: Release, L: Mute
34	PE3/AN15	SELV1	O	Selecting switch of slicer input (pin 81: CVBSIN)
35	PE4	SELV3_AV1	O	Selecting switch of AV1 downstream and L3 input
36	PE5	SELV_DTU	O	Video switch for digital tuner
37	PE6	YVSEL	O	Not used
38	PE7	SWSTBY	O	Not used
39	VSS4	GND	–	Ground
40	VDD4	VDD4	–	Power supply

No.	Mark	Pin Name	I/O	Pin Function
41	PF0	FUNC_ON	O	Function output signal of SCART
42	PF1	SQU	O	Squeeze output superimposed signal
43	PF2	CONDET	I	Electric discharge detection of capacitor for power supply backup
44	PF3	S1	O	Not used
45	PF4/IRP	IROUT	O	Pulse output for IR blaster
46	PF5	P_SAVE2	O	Power save mode switch of HA118326
47	PF6	PSMUTE	O	Audio mute control of SCART
48	PF7	XAVLTH	O	Through switch of AV.Link communication line
49	SI2P0/SO2	SO2	O	SIO2 transmission Not used.
50	SI2P1/SI2/SB2	SI2	O	SIO2 reception Not used.
51	SI2P2/SCK2	SCK2	O	SIO2 communication clock Not used.
52	SI2P3/SCK20	RFTHRU	O	RF through switch of the tuner Control with the main unit setting during standby.
53	PWM1	NC	O	Non connection
54	PWM0	FANCTRL	O	Radiation of heat fan rotating speed control H: Top speed, L: Stop Intermediate speed realizes by PWM
55	VDD2	VDD2	–	Power supply
56	VSS2	GND	–	Ground
57	P00	P_CONT2	O	Power supply control of the main board For controlling 2.5V and 3.3V
58	P01	MUTECTL	O	Mute invalidity control Port to suppress last stage mute
59	P02	EPGEXT	O	Equalizer switch of slicer input video
60	P03	TUON	O	Power supply control of the tuner section There is a case to turn on the power during standby independently.
61	P04	NC	O	
62	P05/CKO	P_CONT	O	Power supply control of the whole system
63	P06/T6O	FLPON	O	Power supply control of the FL tube
64	P07/T7O	XP_SAVE	O	Power supply control of video system
65	P20/INT4/T1IN/T0LCP/T0HCP/INT6/T0LCP1/SSGI0	STATCHG	I	Multiplex status change detection of MSP D_CTR_I/O_1 of MSP
66	P21/INT4/T1IN/T0LCP/T0HCP	NC	I	
67	P22/INT4/T1IN/T0LCP/T0HCP/HCTR	CSYNCIN	I	C-Sync for Auto-Rec
68	P23/INT4/T1IN/T0LCP/T0HCP	XCHECKER	I	Unit checker mounting distinction
69	P24/INT5/T1IN/T0LCP/T0HCP/INT7/T0HCP1/SSGI1	MRST	I	Main board power failure detection Edge interrupt
70	P25/INT5/T1IN/T0LCP/T0HCP	AVLIN	I	AV.Link input line
71	P26/INT5/T1IN/T0LCP/T0HCP	NC	O	
72	P27/INT5/T1IN/T0LCP/T0HCP	BLANKIN	I	BLANK signal input of the SCART
73	P30/PWM4	LED_DVD	O	DVD Indicator
74	P31/PWM5	TU_DCCON	O	DC/DC converter For +32V generation
75	P32/UTX1	TXD1	O	Transmission for RS-232C terminal
76	P33/URX1	RXD1	I	Reception for RS-232C terminal
77	P34/UTX2	TXD2	O	UART2 transmission Not used.
78	P35/URX2	RXD2	O	UART2 reception Not used.
79	P36	HS_TTOM	O	System controller communication handshake From tuner controller to system controller
80	VDDODA	VDDODA	–	Power supply

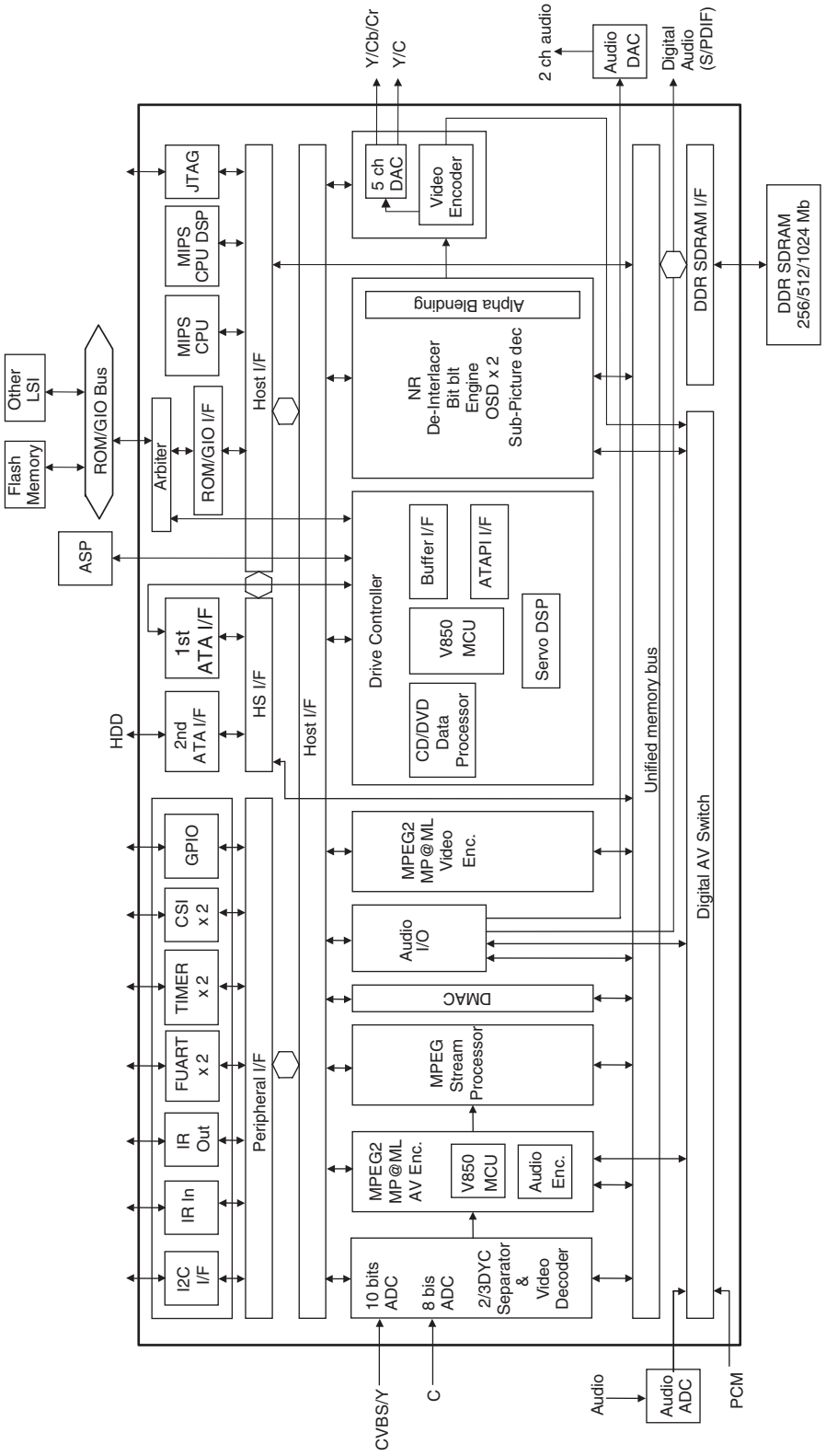
No.	Mark	Pin Name	I/O	Pin Function
81	PB6/CVD/CSYNC	CVBSIN	I	Input video for data slicer 1.0Vpp
82	VSSVCO	GND	–	Ground
83	PB4/FILTSLC	FILTSLC	I	External filter for slicer PLL
84	VDDVCO	VDDVCO	–	Power supply
85	PB2	DT_TUON	O	Power control for DTB
86	PB1	ANT5V_SW	O	Antenna power control for digital broadcasting
87	PB0/DS1FLD	DET_ANT	O	Shortcircuit detection for antenna power line
88	VSS3	GND	–	Ground
89	VDD3	VDD3	–	Power supply
90	PC7/DBGP2	DBGP2	O/D	Control port for on-chip debugger
91	PC6/DBGP1	DBGP1	O/D	Control port for on-chip debugger
92	PC5/DBGP0	DBGP0	O/D	Control port for on-chip debugger
93	PC4/AN11	LED_HDD	O	HDD Indicator
94	PC3/AN10	LED_HDD2	O	External HDD (HDD2) indicator
95	PC2/AN9	LED_DUB	O	Copy indicator
96	PC1/AN8	LED_REC	O	REC indicator
97	PC0/OCSYNC	LED_ATV	O	ATV indicator
98	PA0/SO7	SD_TTOM	O	System controller communication data line From tuner controller to system controller
99	PA1/SI7/SB7	SD_MTOT	I	System controller communication data line From system controller to tuner controller
100	PA2/SCK7	SCK_MTOT	I	System controller communication clock From system controller to tuner controller

■ UPD61272F1-107KA3A (MAIN ASSY : IC1001)

(EMMA2RFE)

• DVDR IC

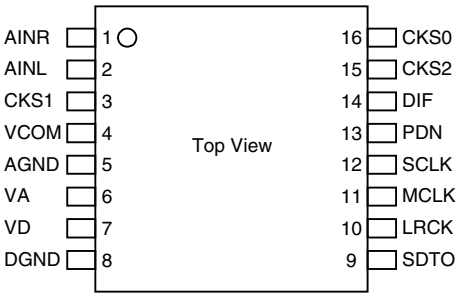
● BLOCK DIAGRAM



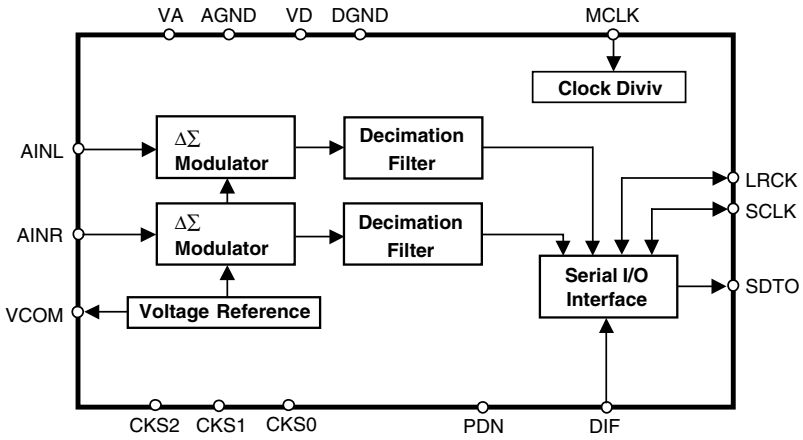
■ AK5359ET (MAIN ASSY : IC3101)

• AD Converter

● Pin Arrangement



● Block Diagram



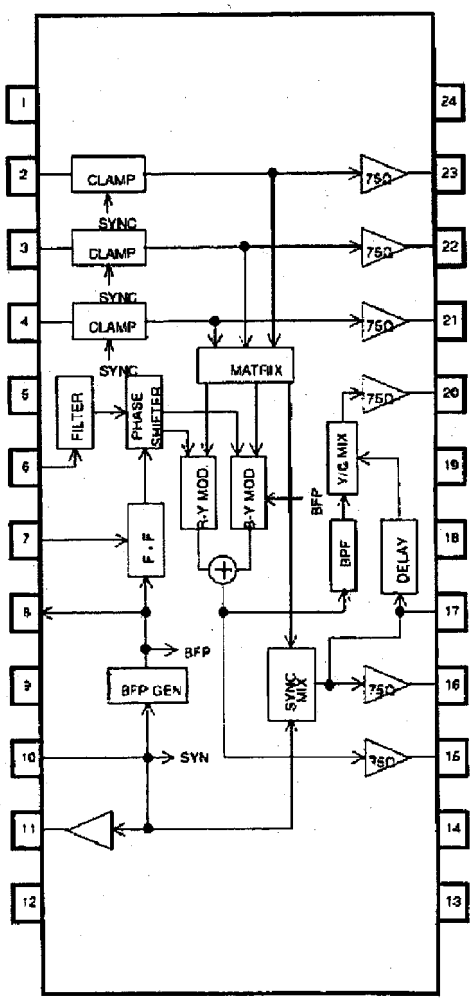
● Pin Function

No.	Pin Name	I/O	Pin Function
1	AINR	I	Rch Analog Input Pin
2	AINL	I	Lch Analog Input Pin
3	CKS1	I	Mode Select 1 Pin
4	VCOM	O	Common Voltage Output Pin, VA/2 Bias voltage of ADC input.
5	AGND	–	Analog Ground Pin
6	VA	–	Analog Power Supply Pin, 4.5 – 5.5V
7	VD	–	Digital Power Supply Pin, 3.0 – 5.5V
8	DGND	–	Digital Ground Pin
9	SDTO	O	Audio Serial Data Output Pin "L" Output at Power-down mode.
10	LRCK	I/O	Output Channel Clock Pin "L" Output in Master Mode at Power-down mode.
11	MCLK	I	Master Clock Input Pin
12	SCLK	I/O	Audio Serial Data Clock Pin "L" Output in Master Mode at Power-down mode.
13	PDN	I	Power Down Mode & Reset Pin "H" : Power up, "L" : Power down & Reset The AK5359 must be reset once upon power-up.
14	DIF	I	Audio Interface Format Pin "H" : 24bit I2S Compatible, "L" : 24bit MSB justified
15	CKS2	I	Mode Select 2 Pin
16	CKS0	I	Mode Select 0 Pin

■ BH7236AF (JACB ASSY : IC511)

• Color TV Signal Encoder

● BLOCK DIAGRAM



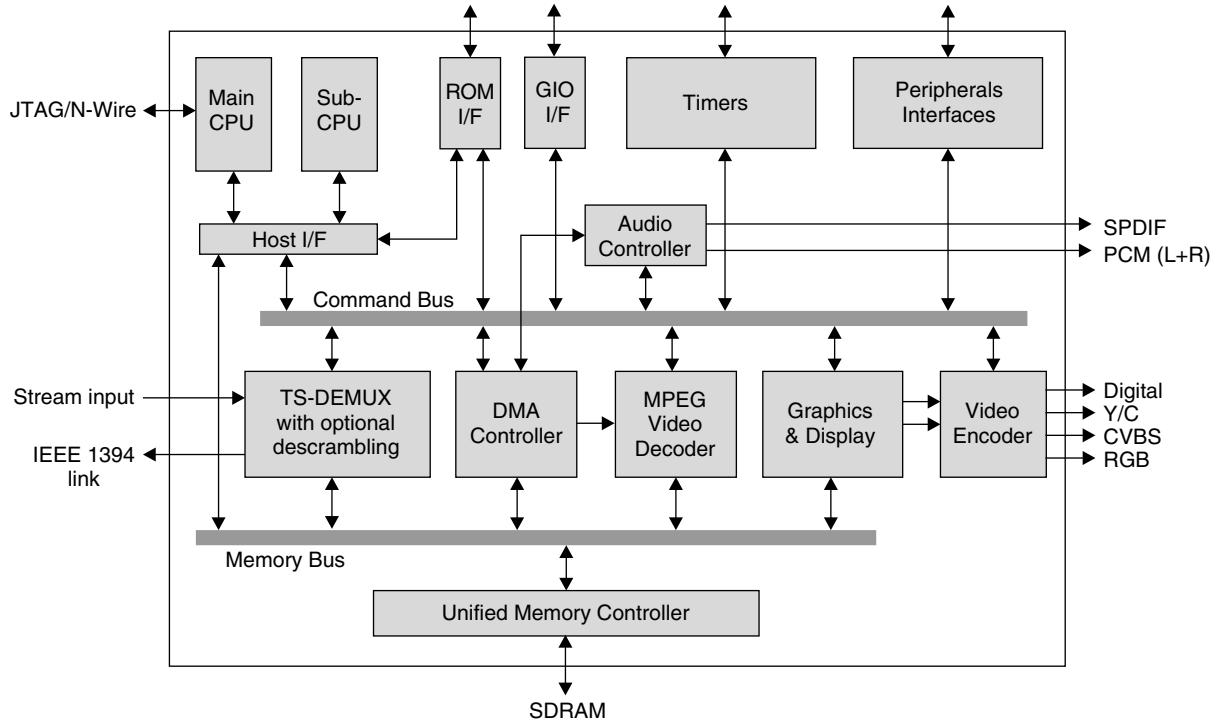
● PIN FUNCTION

Terminal No.	Terminal name	Description of terminals	Termina No.	Terminal name	Description of terminals
1	GND1	Ground terminal except 75Ω driver	13	N.C.	No Connection
2	RIN	Analog Red signal input terminal.	14	N.C.	No Connection
3	GIN	Analog Green signal input terminal.	15	COUT	Chroma signal output terminal.
4	BIN	Analog Blue signal input terminal.	16	YOUT	Luminance signal output terminal.
5	N.C.	No Connection	17	YTRAP	Luminance trap filter terminal.
6	SCIN	Color subcarrier input terminal.	18	N.C.	No Connection
7	NT/PAL	Input terminal for the selection of TV format.	19	VCC2	Power supply terminal for 75Ω driver.
8	BFPOUT	Burst timing signal output terminal.	20	VOUT	Composite video output terminal.
9	N.C.	No Connection	21	BOUT	Analog B signal output terminal.
10	SYNCIN	Composite sync input terminal.	22	GOUT	Analog G signal output terminal.
11	SYNCOUT	Composite sync output terminal.	23	ROUT	Analog R signal output terminal.
12	VCC1	Power supply terminal except 75Ω driver.	24	GND2	Ground terminal for 75Ω driver

■ UPD6110GM-100UEVA (DTBR ASSY : IC106)

• DTB Receiver/Decoder

● Block Diagram



● Pin Function

Table 1 : Power and Ground

Pin name	Pin nos.	Description
GND	11, 12, 28, 42, 43, 54, 67, 68, 110, 138, 139, 152, 161, 162, 163, 164, 176, 184, 185, 194, 206, 214, 215	Main supply ground
DGND	84, 94, 95	Digital Ground for video DACs
AGND	77, 80, 87, 90	Analog Ground for Video DACs
PAGND	135	Ground for PLL 1.5V supply
DVDD	85, 96	Digital VDD (1.5V) for video DACs
VDD1	13, 44, 69, 134, 177, 207	1.5V supply (core)
VDD2	153, 160, 175, 186, 195, 205, 213	3.3V for Unified Memory I/F IO buffers
VDD3	27, 53, 109, 140, 216	3.3V for IO buffers
AVDD	78, 81, 88, 91	3.3V supply for Video DACs
PAVDD	136	1.5V supply for PLL

Table 2 : System

Pin name	Pin no.	Description	In/Out
CLK27IN	137	27MHz Input clock from VCXO	I
RSTOUT	142	RESET out from Watch Dog Timer	O
RSTSWB	143	Hardware RESET	I
NMI	144	Non Maskable Interrupt (see note A in **table8** below)	I

Table 3 : PCR

Pin name	Pin no.	Description	In/Out
PWMOUT	141	PWM output to control the 27MHz VCXO	O

Table 4 : JTAG

Pin name	Pin no.	Description	In/Out
JTDI	147	EJTAG data input	I
JTCK	150	EJTAG clock	I
JTDO	148	EJTAG data output	O
JTMS	149	EJTAG mode select	I
JTRST	151	EJTAG reset	I
EDINT	144[A]	Debug interrupt	I

A : In normal use, pin 144 is exclusive to the NMI input. In debugging mode, pin144 is the EDINT input.

Table 5 : Test

Pin name	Pin no.	Description	In/Out
TEST	75	For test use only. Connect to GND.	I

Table 6 : Unified Memory Interface

Pin name	Pin nos.	Description	In/Out
DADD0~DADD12	190 (DADD0), 189, 188, 187, 183, 182, 181, 180, 179, 178, 191, 174, 173 (DADD12)	Address Bus	O
DQ0~DQ15	212 (DQ0), 211, 210, 209, 208, 204, 203, 202, 166, 165, 159, 158, 157, 156, 155, 154 (DQ15)	Data Bus	I/O
DCSB	196	Chip select	O
DRASB	197	RAS signal	O
DCASB	198	CAS signal	O
DWEB	199	Command write enable	O
DQM0~DQM1	200, 169	Data mask	O
DBA0~1	193, 192	Bank address	O
DCKE	172	Clock enable	O
DQS1	167	Connect to DCLK	I
DCLK	171	Clock output	O

Table 7 : Audio Output

Pin name	Pin no.	Description	In/Out
AMCK	66	PCM Audio Master Clock	O
ALRCK	73	PCM Audio L/R Clock	O
ABCK	70	PCM Audio Data Clock	O
ADO	72	PCM Audio Data – L/R	O
ATX	71	SPDIF Digital audio output	O

Table 8 : I²C Interface

Pin name	Pin no.	Description	In/Out
SDA0	117	I²C-0 Serial Data	I/O
SCL0	118	I²C-0 Serial Clock	I/O

Table 9 : Video DAC outputs[A]

Pin name	Pin no.	Description
VACVBS	79	Composite video (analog)
VAY	76	Y signal (analog)
VAPR	86	Pr signal
VAPB	89	Pb signal
RSET0	82	Resistor for adjusting full scale currents
RSET1	92	
REF0	83	External voltage reference
REF1	93	

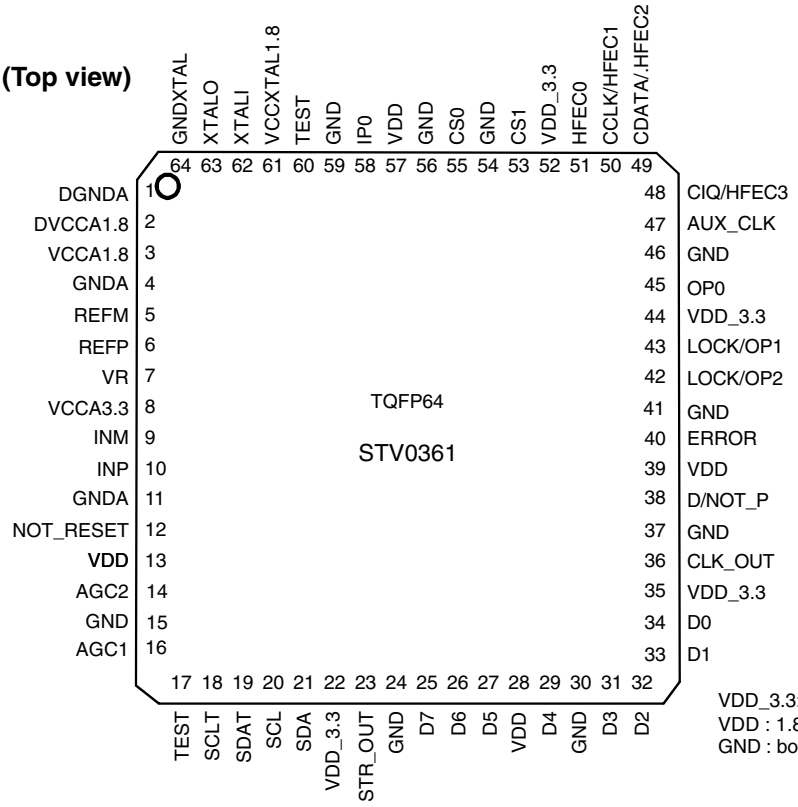
Unused pins

Pin name	Pin no.	Disposition
N/C	168	Connect to ground
N/C	170	Not connected
N/C	201	Connect to ground

■ STV0361L (DTBR ASSY : IC313)

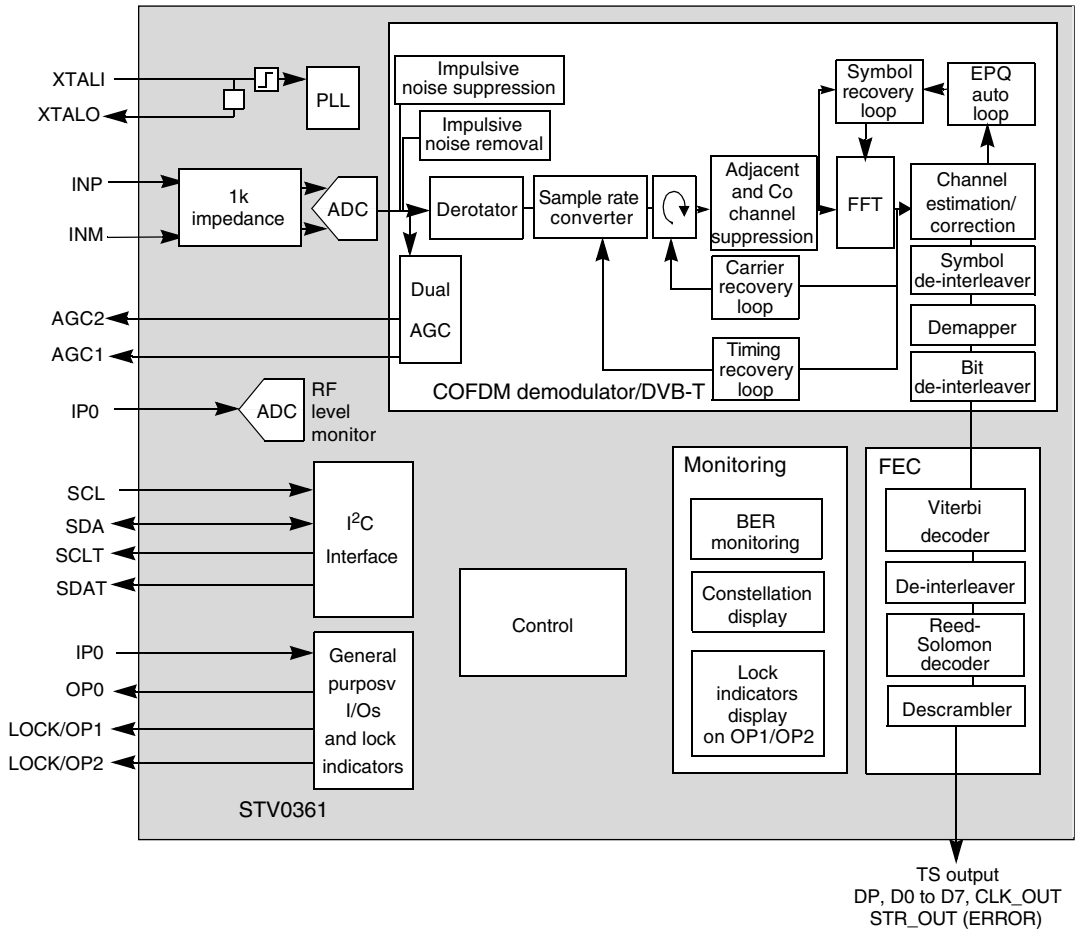
• COFDM IC

● Pin Arrangement (Top view)



VDD_3.3: 3.3V output buffer supply
VDD : 1.8V core and input buffer supply
GND : both core and buffer ground

● Block Diagram



● **Pin Function**

Pin number	Name	Type	Description	Drive (mA)
Clock and resets				
12	NOT_RESET	Input[1]	Hardware reset, active low	–
62	XTALI	Analog	Crystal oscillator input/external clock (1.8 V)	–
63	XTALO	Analog	Crystal oscillator output	–
61	VCCXTAL1.8	Supply	Analog oscillator supply (1.8 V)	–
64	GNDXTAL	Ground	Analog oscillator ground	–
Analog interface				
2	DVCCA1.8	Supply	Analog part digital supply (1.8V)	–
5	REFM	Analog	Internal negative reference	–
6	REFP	Analog	Internal positive reference	
3	VCCA1.8	Supply	Analog supply (1.8V)	–
9	INM	Analog	Negative analog input	–
10	INP	Analog	Positive analog input	–
4, 11	GNDA	Supply	Analog supply	–
1	DGNDA	Ground	Analog ground	–
7	VR	Analog	Reference	–
8	VCCA3.3	Supply	Analog supply (3.3V)	
I²C interface				
21	SDA	I/O[2]	Serial data (open drain and 5 V tolerant)	8
20	SCL	Input	Serial clock (open drain and 5 V tolerant)	–
19	SDAT	I/O	SDA tuner (open drain and 5 V tolerant)	4
18	SCLT	Input	SCL tuner (5 V tolerant)	
MPEG interface				
25, 26, 27, 29, 31, 32, 33, 34	D7/0	Output[3]	Serial D7, MPEG data	8/4
36	CLK_OUT	Output	MPEG byte or bit clock	4
23	STR_OUT	Output	MPEG first byte sync	2
38	D/NOT_P	Output	MPEG data valid/parity	4
40	ERROR	Output	MPEG packet error	2
51	HFEC0	Output	Hierarchical FEC output bit 0	2
50	CCLK/HFEC1	Output	Hierarchical FEC output bit 1 or clock for constellation display	2
49	CDATA/HFEC2	Output	Hierarchical FEC output bit 2 or data for constellation display	2
48	CIQ/HFEC3	Output	Hierarchical FEC output bit 3 or IQ validation for constellation display	2

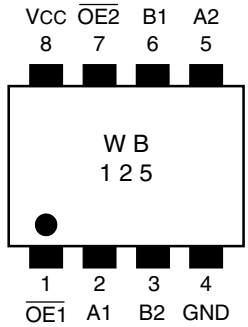
Pin number	Name	Type	Description	Drive (mA)
Front end controls				
16	AGC1	I/O	RF AGC control ΔΣ(5 V tolerant)	4
14	AGC2	I/O	IF AGC control ΔΣ(5 V tolerant)	4
17, 60	TEST		Reserved test mode, must be grounded	
58	IP0	Input	General-purpose input port 0 and ADC input for RF level monitoring	-
45	OP0	I/O	General-purpose output port 0	4
43	LOCK/OP1	I/O	General-purpose output port 1 or lock indicator	4
42	LOCK/OP2	Output	General-purpose output port 2 or lock indicator	4
47	AUX_CLK	I/O	Auxiliary clock	8
55	CS0	Input	Chip select LSB	-
53	CS1	Input	Chip select MSB	-
Power supply				
13, 28, 39, 57	VDD	Supply	Digital core supply	
22, 35, 44, 52	VDD_3.3	Supply	Digital I/O supply	
15, 24, 30, 37, 41, 46, 54, 56, 59	GND	Ground		

1. All inputs are 3.3V compatible.
2. All bidirectional pads are 3.3V capable.
3. All outputs are 3.3V capable.

■ TC7WB125FK (DTBR ASSY : IC314)

• Dual BUS Switch

● Pin Arrangement (Top view)



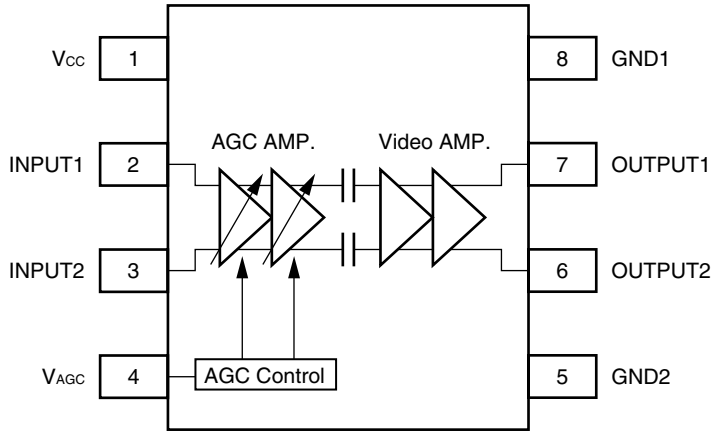
● Truth Table

Inputs $\overline{OE}$	Function
L	A port = B port
H	Disconnect

■ UPC3221GV (DTBR ASSY : IC311)

• IF AGC IC

● Pin Arrangement (Top view)



● Pin Function

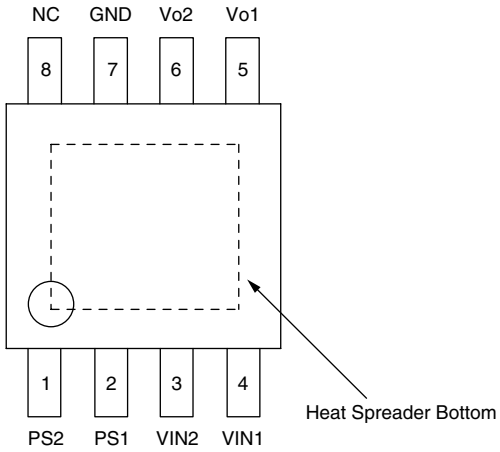
Pin No.	Pin Name	Applied Voltage (V)	Pin Voltage (V) Note	Function and Application
1	V_{CC}	4.5 to 5.5	–	Power supply pin. This pin should be externally equipped with bypass capacitor to minimize ground impedance.
2	INPUT1	–	1.29	Signal input pins to AGC amplifier. This pin should be coupled with capacitor for DC cut.
3	INPUT2	–	1.29	
4	V_{AGC}	0 to V_{CC}	–	Gain control pin. This pin's bias govern the AGC output level. Minimum Gain at V_{AGC} : 0 to 0.5 V Maximum Gain at V_{AGC} : 3 to 3.5 V Recommended to use AGC voltage with externally resister (example: 1 kΩ).
5	GND2	0	–	Ground pin. This pin should be connected to system ground with minimum inductance. Ground pattern on the board should be formed as wide as possible.
6	OUTPUT2	–	2.28	Signal output pins of video amplifier. This pin should be coupled with capacitor for DC cut.
7	OUTPUT1	–	2.28	
8	GND1	0	–	Ground pin. This pin should be connected to system ground with minimum inductance. Ground pattern on the board should be formed as wide as possible. All ground pins must be connected together with wide ground pattern to decrease impedance difference.

Note : Pin voltage is measured at V_{CC} = 5.0 V.

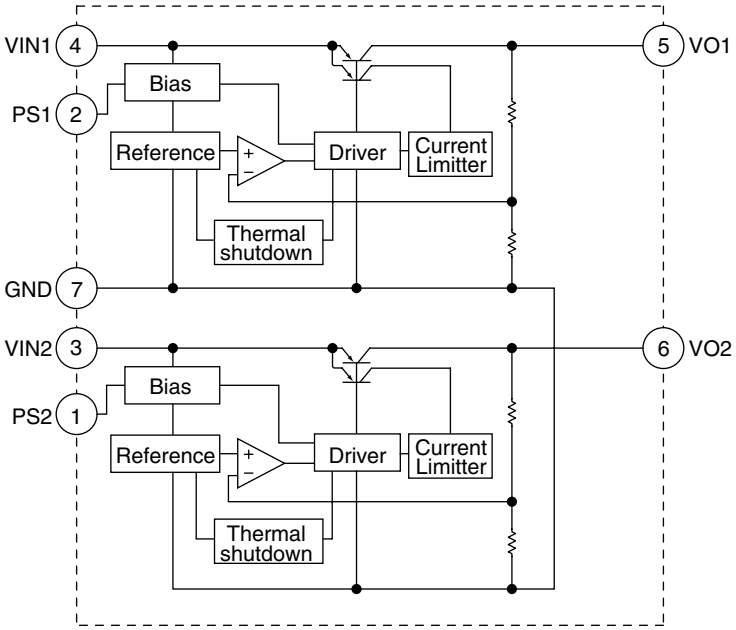
■ MM1689FH (DTBR ASSY : IC307)

• Dual Regulator

● Pin Arrangement (Top view)



● Block Diagram



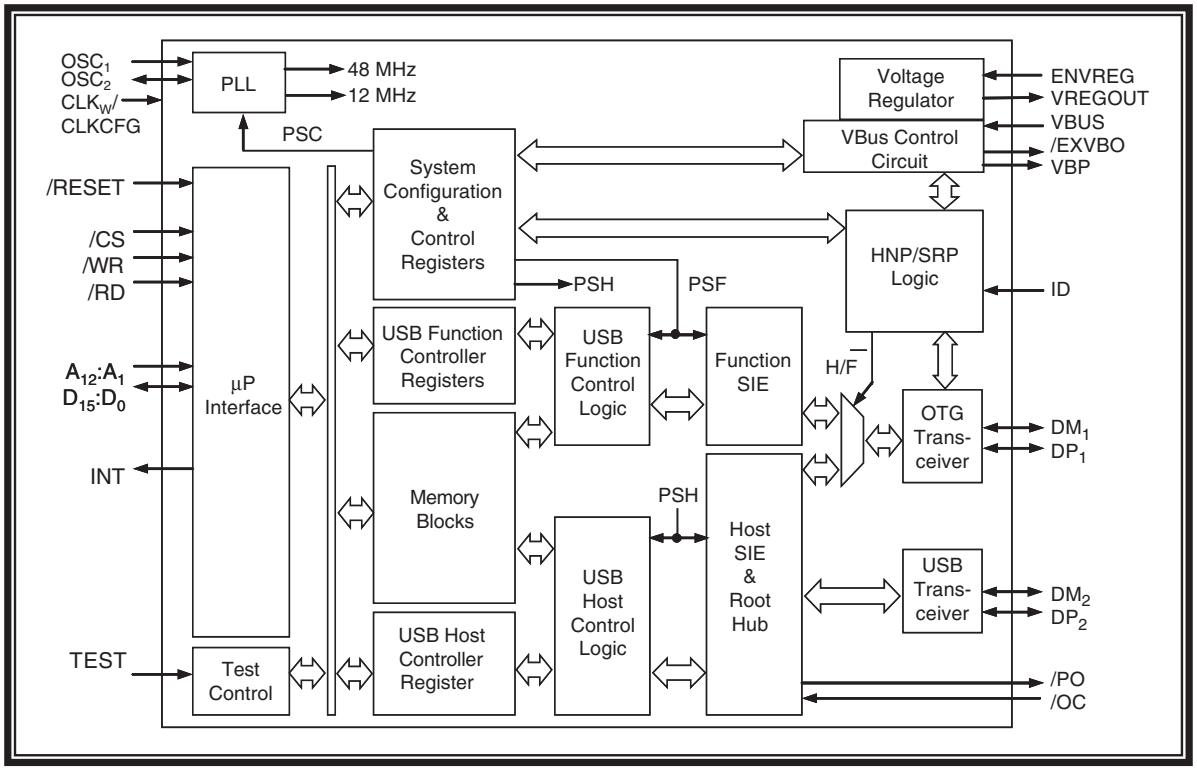
● Pin Function

No.	Pin Name	Pin Function
1	PS2	ON/OFF Control pin Cont / Vo: H / On; L / OFF Cont pin must be connected with Vin pin, if it is not used.
2	PS1	ON/OFF Control pin
3	VIN2	Input pin The capacitor is required to connect with input pin more than 1 μ F.
4	VIN1	Input pin
5	VOUT1	Output pin The capacitor must be connected with output pin more than 1 μ F.
6	VOUT2	Output pin
7	GND	Ground
8	NC	No connection

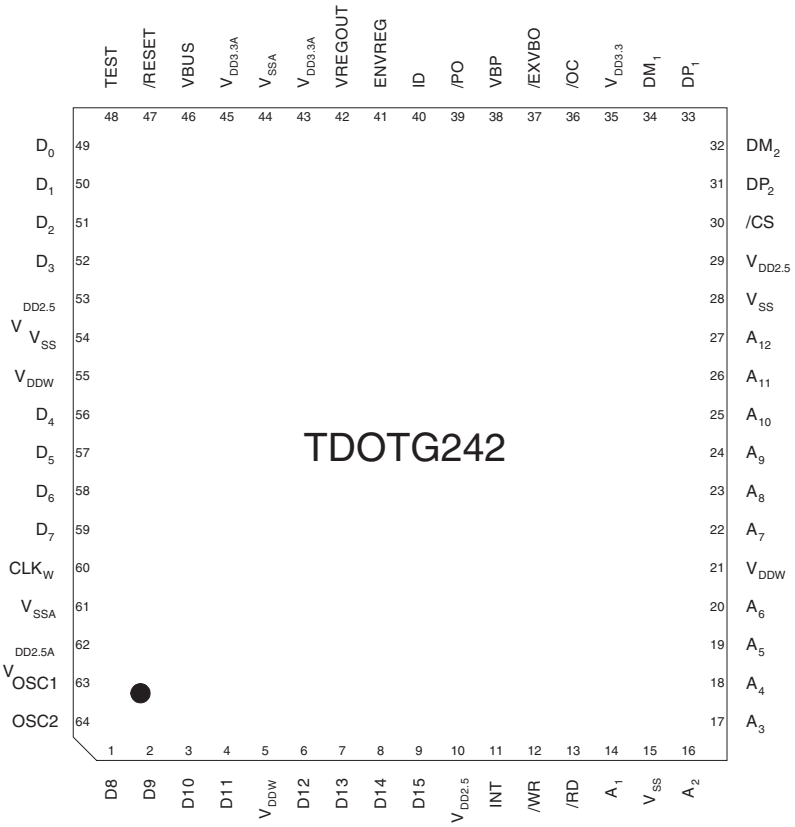
■ TDOTG242-0F0C8 (MAIN ASSY : IC5701)

• USB Controller IC

● BLOCK DIAGRAM



● **PIN LAYOUT**



● **PIN NAME**

1	D_8	17	A_3	33	DP_1	49	D_0
2	D_9	18	A_4	34	DM_1	50	D_1
3	D_{10}	19	A_5	35	$V_{DD3.3}$	51	D_2
4	D_{11}	20	A_6	36	/OC	52	D_3
5	V_{DDW}	21	V_{DDW}	37	/EXVBO	53	$V_{DD2.5}$
6	D_{12}	22	A_7	38	VBP	54	V_{SS}
7	D_{13}	23	A_8	39	/PO	55	V_{DDW}
8	D_{14}	24	A_9	40	ID	56	D_4
9	D_{15}	25	A_{10}	41	ENVREG	57	D_5
10	$V_{DD2.5}$	26	A_{11}	42	VREGOUT	58	D_6
11	INT	27	A_{12}	43	$V_{DD3.3A}$	59	D_7
12	/WR	28	Vss	44	V_{SSA}	60	CLK_W
13	/RD	29	$V_{DD2.5}$	45	$V_{DD3.3A}$	61	V_{SSA}
14	A_1	30	/CS	46	VBUS	62	$V_{DD2.5A}$
15	V_{SS}	31	DP_2	47	/RESET	63	OSC_1
16	A_2	32	DM_2	48	TEST	64	OSC_2

OTG242LP pin assignment for the 64-pin LQFP

● **PIN FUNCTION**

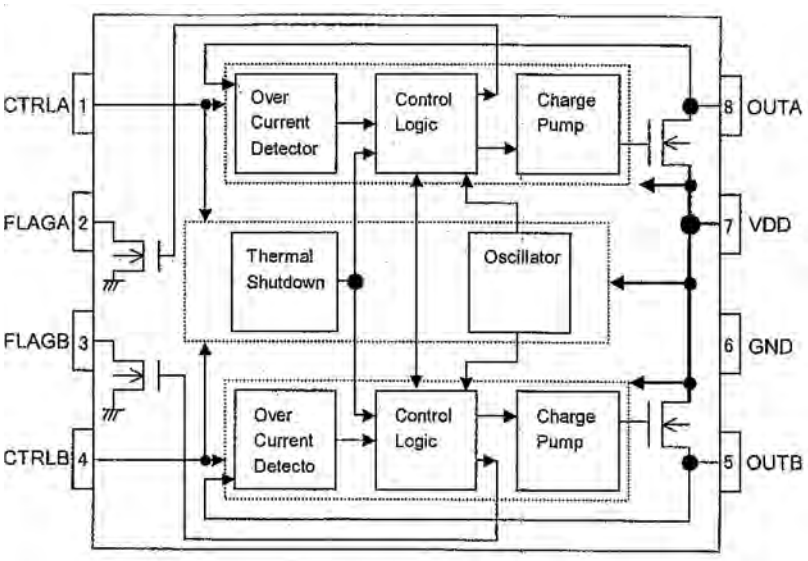
Pin/Signal Name	Signal Type	Active Level	Pin/Signal Description
OSC_1	I		Terminal for OSC.
OSC_2	IO		
/RESET	I	L	Hardware reset.
/CS	I	L	Chip select.
/WR	I	L	Write strobe.
/RD	I	L	Read strobe.
A_{12}:A_1	I		Address bus for an addressing space of 8K bytes.
D_{15}:D_0	IO		16-bit data bus.
TEST	I	H	Factory test mode.
/EXVBO	O	L	Turn on/off the external V_{BUS} (5V) for OTG operation (1: V_{BUS} off; 0: V_{BUS} on).
/PO	O	L	Turn on/off the gang power for all Host ports.
/OC	I	L	Over current condition indicator for gang powered Host ports.
INT[1]	O/WO	PL	Interrupt to the MCU.
ID	I		Connected to the ID pin of the mini-AB connector (Port 1) for OTG applications.
DM_1, DP_1	IO		Data lines for Port 1, which may serve as a USB Host, or OTG port.

Pin/Signal Name	Signal Type	Active Level	Pin/Signal Description
DM_2, DP_2	IO		Data lines for Port 2, a dedicated USB Host port.
VBUS	I		V_{BUS} input sampled during HNP/SRP operations by the OTG port.
VBP	IO	H	V_{BUS} pulsing control. This pin is used only when Port 1 is an OTG port for a B-DEVICE.
CLK_W	I		This pin is available only in the QFP package
CLKCFG	I		This pin is available only in the BGA package
ENVREG	I		Enables the internal Voltage Regulator if asserted.
VREGOUT	PW		Internal Voltage Regulator output of 2.5V
$V_{DD3.3A}$	PW		Analog +3.3V
$V_{DD2.5A}$	PW		Analog +2.5V
V_{SSA}	PW		Analog ground.
$V_{DD2.5}$	PW		Digital +2.5V
V_{DDW}	PW		Wide-range IO +3.3V or +2.5V.
V_{SS}	PW		Digital/Wide-range IO ground.
NC	PS		No connection. These pins should be left floating.

BD6517F (MAIN ASSY: IC5631)

• High Side Switch

● Block Diagram



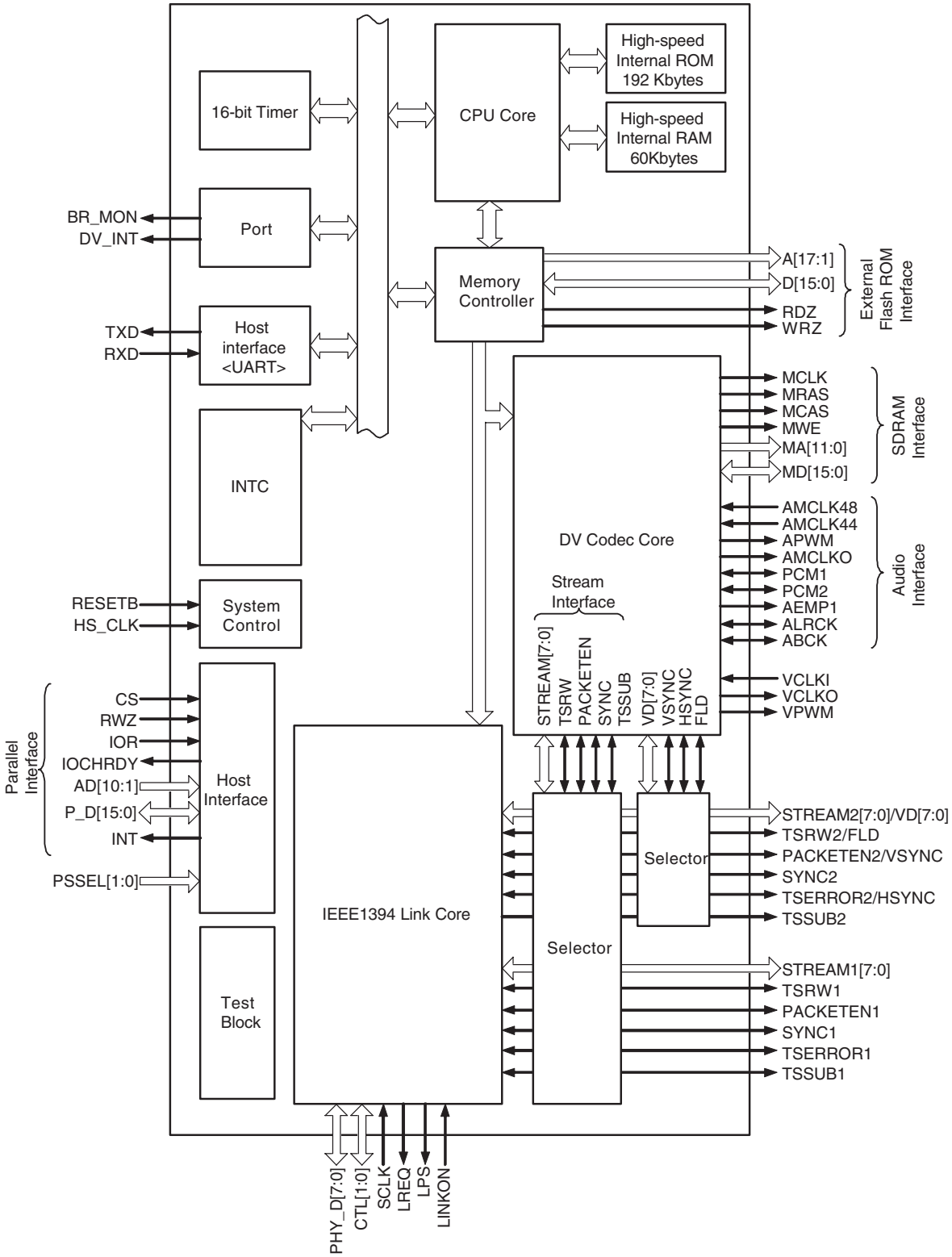
● Pin Function

No.	Pin Name	I/O	Function
1	CTRLA	I	Enable Input
2	FLAGA	O	Fault Flag Output
3	FLAGB	O	Fault Flag Output
4	CTRLB	I	Enable Input
5	OUTB	O	Switch Output
6	GND	–	Ground
7	VDD	–	Supply Input
8	OUTA	O	Switch Output

■ UPD72893BF1-FN3 (DVJB ASSY : IC102)

• DV-CODEC IC

● BLOCK DIAGRAM



● PIN LAYOUT

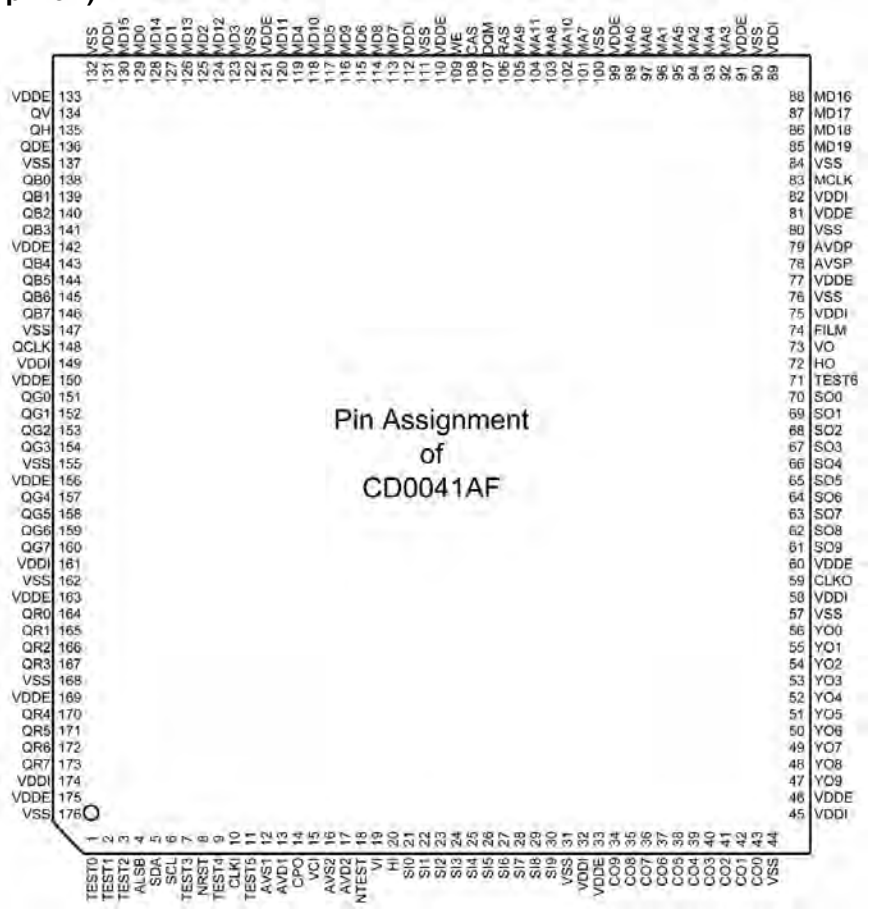
• 208-pin plastic FBGA (15x15)

	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	U
17	A3	A2	A1	IC(PL)	3.3GND	2.5GND	3.3VDD	P_D9	P_D5	P_D2	INT	IOR	AD10	AD6	AD4	AD2	PSSEL1
16	A5	A4	BR_MON	IC(PH)	IC(PH)	P_D15	P_D12	P_D8	3.3GND	3.3VDD	IOCHRDY	RWZ	AD9	AD5	AD3	AD1	PSSEL0
15	A7	A6	IC (PL)	RXD	IC(PH)	P_D14	P_D11	P_D7	P_D4	P_D1	IC(O)	2.5VDD	AD8	AMCLKO	APWM	AMCLK44	AMCLK48
14	A9	A8	DV_INT	TXD	IC(PH)	P_D13	P_D10	P_D6	P_D3	P_D0	IC(H)	CS	AD7	PCM2	AEMP1	3.3GND	IC(O)
13	A12	A11	3.3VDD	A10										ALRCK	ABCK	3.3VDD	PCM1
12	A15	A14	2.5VDD	A13										MA9	MA10	2.5GND	MA11
11	RDZ	A17	A16	3.3GND										MA5	MA6	MA7	MA8
10	D2	D1	D0	WRZ										MA2	3.3GND	MA3	MA4
9	D6	D5	D4	D3										MCLK	3.3VDD	MA0	MA1
8	3.3GND	3.3VDD	D8	D7										MD15	MWE	MCAS	MRAS
7	D12	D11	D10	D9										MD11	MD12	MD13	MD14
6	D15	2.5GND	D14	D13										MD9	MD10	2.5VDD	3.3GND
5	PLLAGND	PLLAVDD	PLLDVDD	IC(L)										MD6	MD7	3.3VDD	MD8
4	HS_CLK	PLLDGND	RESETB	3.3VDD	3.3GND	CTL0	LPS	STREAM12	STREAM16	TSRW1	PACKETEN2/ VSYNC	SYNC2	STREAM21/ VD1	STREAM25/ VD5	AFS2	MD4	MD5
3	IC (PL)	IC (L)	PHY_D7	PHY_D4	PHY_D1	2.5VDD	LINKON	STREAM13	STREAM17	SYNC1	TSERROR2/ HSYNC	TSSUB2	STREAM22/ VD2	STREAM26/ VD6	VCLKI	MD2	MD3
2	IC (L)	IC (L)	PHY_D6	PHY_D3	PHY_D0	SCLK	STREAM10	STREAM14	PACKETEN1	3.3VDD	3.3GND	2.5GND	STREAM23/ VD3	STREAM27/ VD7	VCLKO	MD1	3.3GND
1	IC (H)	IC (L)	PHY_D5	PHY_D2	CTL1	LREQ	STREAM11	STREAM15T	SERROR1	TSSUB1	TSRW2/ FLD	STREAM20/ VD0	STREAM24/ VD4	AFS13	3.3VDD	VPWM	MD0

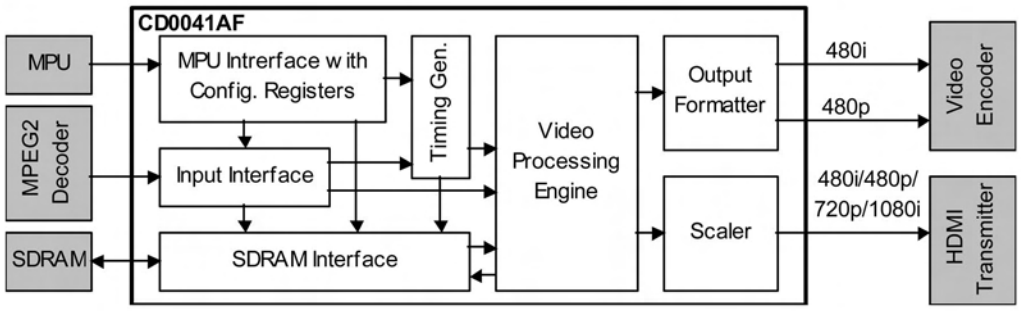
■ CD0041AF (HDMI ASSY: IC101)

• SD to HD Scaler

● Pin Arrangement (Top view)



● Block Diagram



● Pin Function

No.	Pin Name	I/O	Function	No.	Pin Name	I/O	Function
1	TEST0	I	Test terminal	9	TEST4	I	Test terminal
2	TEST1	I	Test terminal	10	CLKI	I	27MHz clock input terminal
3	TEST2	I	Test terminal	11	TEST5	I	Test terminal
4	ALSB	I	IIC slave address setting terminal	12	AVS1	P	PLL1 only Analog Ground
5	SDA	I/O	IIC data in/out terminal	13	AVD1	P	PLL1 only Analog VDD (3.3V)
6	SCL	I	IIC clock input terminal	14	CPO	O	PLL1 charge pump output terminal
7	TEST3	I	Test terminal	15	VCI	I	PLL1 VCO input terminal
8	MRST	I	System reset input (Low Active)	16	AVS2	P	PLL1 only Analog Ground

No.	Pin Name	I/O	Function	No.	Pin Name	I/O	Function
17	AVD2	P	PLL1 only Analog GND	57	VSS	P	Digital GND
18	NTEST	I	TEST only input terminal	58	VDDI	P	VDD (1.8V) for Core
19	VI	I	Vertical Sync input terminal	59	CLKO	O	27MHz clock output terminal
20	HI	I	Horizontal Sync input terminal	60	VDDE	P	VDD (3.3V) for IO
21	SI0	I	ITU-R BT.656/601 input terminal (LSB)	61	SO9	O	ITU-R BT.656/601 output terminal (LSB)
22	SI1	I	ITU-R BT.656/601 input terminal	62	SO8	O	ITU-R BT.656/601 output terminal
23	SI2	I	ITU-R BT.656/601 input terminal	63	SO7	O	ITU-R BT.656/601 output terminal
24	SI3	I	ITU-R BT.656/601 input terminal	64	SO6	O	ITU-R BT.656/601 output terminal
25	SI4	I	ITU-R BT.656/601 input terminal	65	SO5	O	ITU-R BT.656/601 output terminal
26	SI5	I	ITU-R BT.656/601 input terminal	66	SO4	O	ITU-R BT.656/601 output terminal
27	SI6	I	ITU-R BT.656/601 input terminal	67	SO3	O	ITU-R BT.656/601 output terminal
28	SI7	I	ITU-R BT.656/601 input terminal	68	SO2	O	ITU-R BT.656/601 output terminal
29	SI8	I	ITU-R BT.656/601 input terminal	69	SO1	O	ITU-R BT.656/601 output terminal
30	SI9	I	ITU-R BT.656/601 input terminal (MSB)	70	SO0	O	ITU-R BT.656/601 output terminal (LSB)
31	VSS	P	Digital GND	71	TEST6	I	TEST terminal
32	VDDI	P	VDD (1.8V) for Core	72	HO	O	Horizontal Sync output terminal
33	VDDE	P	VDD (3.3V) for IO	73	VO	O	Vertical Sync output terminal
34	CO9	O	ANSI/SMPTE 293M output (Cb/Cr, MSB)	74	FILM	O	FILM detect flag output terminal
35	CO8	O	ANSI/SMPTE 293M output (Cb/Cr)	75	VDDI	P	VDD (1.8V) for Core
36	CO7	O	ANSI/SMPTE 293M output (Cb/Cr)	76	VSS	P	Digital GND
37	CO6	O	ANSI/SMPTE 293M output (Cb/Cr)	77	VDDE	P	VDD (3.3V) for IO
38	CO5	O	ANSI/SMPTE 293M output (Cb/Cr)	78	AVSP	P	PLL2 only Analog GND
39	CO4	O	ANSI/SMPTE 293M output (Cb/Cr)	79	AVDP	P	PLL1 only Analog VDD (1.8V)
40	CO3	O	ANSI/SMPTE 293M output (Cb/Cr)	80	VSS	P	Digital GND
41	CO2	O	ANSI/SMPTE 293M output (Cb/Cr)	81	VDDE	P	VDD (3.3V) for IO
42	CO1	O	ANSI/SMPTE 293M output (Cb/Cr)	82	VDDI	P	VDD (1.8V) for Core
43	CO0	O	ANSI/SMPTE 293M output (Cb/Cr, LSB)	83	MCLK	O	SDRAM clock output terminal (108MHz)
44	VSS	P	Digital GND	84	VSS	P	Digital GND
45	VDDI	P	VDD (1.8V) for Core	85	MD19	I/O	SDRAM data in/out terminal
46	VDDE	P	VDD (3.3V) for IO	86	MD18	I/O	SDRAM data in/out terminal
47	YO9	O	ANSI/SMPTE 293M output (Y, MSB)	87	MD17	I/O	SDRAM data in/out terminal
48	YO8	I	ANSI/SMPTE 293M output (Y)	88	MD16	I/O	SDRAM data in/out terminal
49	YO7	I	ANSI/SMPTE 293M output (Y)	89	VDDI	P	VDD (1.8V) for Core
50	YO6	I	ANSI/SMPTE 293M output (Y)	90	VSS	P	Digital GND
51	YO5	I	ANSI/SMPTE 293M output (Y)	91	VDDE	P	VDD (3.3V) for IO
52	YO4	I	ANSI/SMPTE 293M output (Y)	92	MA3	O	SDRAM address output terminal
53	YO3	I	ANSI/SMPTE 293M output (Y)	93	MA4	O	SDRAM address output terminal
54	YO2	I	ANSI/SMPTE 293M output (Y)	94	MA2	O	SDRAM address output terminal
55	YO1	I	ANSI/SMPTE 293M output (Y)	95	MA5	O	SDRAM address output terminal
56	YO0	I	ANSI/SMPTE 293M output (Y, LSB)	96	MA1	O	SDRAM address output terminal

No.	Pin Name	I/O	Function	No.	Pin Name	I/O	Function
97	MA6	O	SDRAM address output terminal	137	VSS	IP	Digital GND
98	MA0	O	SDRAM address output terminal (LSB)	138	QB0	O	Video data B output terminal (LSB)
99	VDDE	P	VDD (3.3V) for IO	139	QB1	O	Video data B output terminal
100	VSS	P	Digital GND	140	QB2	O	Video data B output terminal
101	MA7	O	SDRAM address output terminal	141	QB3	O	Video data B output terminal
102	MA10	O	SDRAM address output terminal	142	VDDE	P	VDD (3.3V) for IO
103	MA8	O	SDRAM address output terminal	143	QB4	O	Video data B output terminal
104	MA11	O	SDRAM address output terminal (MSB)	144	QB5	O	Video data B output terminal
105	MA9	O	SDRAM address output terminal	145	QB6	O	Video data B output terminal
106	RAS	O	SDRAM RAS command output	146	QB7	O	Video data B output terminal
107	DQM	O	SDRAM DQM output	147	VSS	P	Digital GND
108	CAS	O	SDRAM CAS command output	148	QCLK	O	Pixelclock output terminal
109	WE	O	SDRAM Write Enable command output	149	VDDI	P	VDD (1.8V) for Core
110	VDDE	P	VDD (3.3V) for IO	150	VDDE	P	VDD (3.3V) for IO
111	VSS	P	Digital GND	151	QG0	O	Video data G output terminal (LSB)
112	VDDI	P	VDD (1.8V) for Core	152	QG1	O	Video data G output terminal
113	MD7	I/O	SDRAM data in/out terminal	153	QG2	O	Video data G output terminal
114	MD8	I/O	SDRAM data in/out terminal	154	QG3	IO	Video data G output terminal
115	MD7	I/O	SDRAM data in/out terminal	155	VSS	P	Digital GND
116	MD6	I/O	SDRAM data in/out terminal	156	VDDE	P	VDD (3.3V) for IO
117	MD5	I/O	SDRAM data in/out terminal	157	QG4	O	Video data G output terminal
118	MD10	I/O	SDRAM data in/out terminal	158	QG5	O	Video data G output terminal
119	MD4	I/O	SDRAM data in/out terminal	159	QG6	O	Video data G output terminal
120	MD11	I/O	SDRAM data in/out terminal	160	QG7	O	Video data G output terminal (MSB)
121	VDDE	P	VDD (3.3V) for IO	161	VDDI	P	VDD (1.8V) for Core
122	VSS	P	Digital GND	162	VSS	P	Digital GND
123	MD3	I/O	SDRAM data in/out terminal	163	VDDE	P	VDD (3.3V) for IO
124	MD12	I/O	SDRAM data in/out terminal	164	QR0	I	Video data R output terminal
125	MD2	I/O	SDRAM data in/out terminal	165	QR1	O	Video data R output terminal
126	MD13	I/O	SDRAM data in/out terminal	166	QR2	O	Video data R output terminal
127	MD1	I/O	SDRAM data in/out terminal	167	QR3	O	Video data R output terminal
128	MD14	I/O	SDRAM data in/out terminal	168	VSS	P	Digital GND
129	MD0	I/O	SDRAM data in/out terminal	169	VDDE	P	VDD (3.3V) for IO
130	MD15	I/O	SDRAM data in/out terminal	170	QR4	O	Video data R output terminal
131	VDDI	P	VDD (1.8V) for Core	171	QR5	O	Video data R output terminal
132	VSS	P	Digital GND	172	QR6	O	Video data R output terminal
133	VDDE	P	VDD (3.3V) for IO	173	QR7	O	Video data R output terminal
134	QV	O	Vertical Sync output (for HDMI)	174	VDDI	P	VDD (1.8V) for Core
135	QH	O	Horizontal Sync output (for HDMI)	175	VDDE	P	VDD (3.3V) for IO
136	QDE	O	Data enable output terminal	176	VSS	P	Digital GND

7.3 CAUTIONS ON HANDLING THE HDD

(1) Cautions on Handling the HDD

- The HDD is very sensitive to shocks and vibrations. Care must be taken especially during operation (when the power is on).
- The HDD is very sensitive to electrostatic charges.
- Rapid change in temperature or humidity may cause deterioration of the HDD.

Note: After receiving damage caused by any above-mentioned factors, the HDD may operate normally for dozens or some hundreds of hours but then suddenly crash. If you are certain you have damaged a new repair part (HDD) while making repairs, do not use the part.

The HDD is about 10 times as sensitive to shock during operation than during nonoperation.

Reference: Main specifications on damage to the HDD

	During operation	During nonoperation
Shock G (acceleration)	<approx. 20 G	<approx. 200 G
Temperature change	< 15°C/hour	
Moisture change	< 20%/hour	

Reference: Estimate value of falling distance vs. shock (G) when the HDD is dropped without protection

Falling distance \ Landing surface	Granite surface	Concrete floor	Synthetic-resin-coated table	Antistatic sponge
0.5 inch / 12.7 mm	387	217	200	26
1.0 inch / 25.4 mm	595	457	310	37
2.0 inch / 50.8 mm	1133	600	680	70
4.0 inch / 101.6 mm	1795	1040	1050	267

(2) Cautions on handling the product on which the HDD is mounted or the HDD as a repair part, and examples of dangerous handling

[Cautions on handling the product on which the HDD is mounted]

- While the unit is turned on, the HDD is always in operation. Be sure NOT to impart shock to the unit.

● Examples of dangerous handling: while the power is on

- Bumping on the bonnet
- Dropping an object, such as a small screwdriver or remote control unit, onto the bonnet, or bumping an object against the cabinet
- Moving the unit by dragging
- Stacking another product on the unit

Note: Be sure NOT to impart shock, such as bumping or hitting a screwdriver against the HDD, during diagnosis with the bonnet open.

● Examples of dangerous handling: while the power is off

- Imparting strong shock, although the HDD is more resistant to shock when the power is off
- Dropping the unit from a height of several centimeters, or after lifting one side of the unit up, then letting the unit drop.

- Do NOT move the unit immediately after the power is turned off. Wait at least 30 seconds after the indication on the FL display changed from POWER OFF to the clock indication before moving the unit.
  If the AC power cord is accidentally disconnected before turning the unit off, wait at least for one minute before moving it. In this case, damage to the HDD caused by sudden shutoff may be small, because the emergency relief mechanism is activated. However, if sudden shutoff occurrs during recording or playback, recorded data may be damaged. Be sure to check operations.

[Cautions on handling the HDD as a repair part]

1. Handle the HDD in a safe environment:
   - Handle the HDD over an antistatic pad that can also absorb shock.
   - Wear wrist bands to prevent electrostatic charges generated in your body from affecting the HDD.

2. The following must be observed when handling the HDD:
   - Handle one HDD at a time. Do NOT hold several HDDs at the same time.
   - Grip the HDD on both sides so that you do not touch its terminals or circuit boards.
   - Do NOT stack one HDD onto another HDD (even if the HDDs are protected in antistatic bags).
   - Do NOT bump the HDDs against one another.
   - Do NOT bump any tool, such as a screwdriver, or other hard object against the HDD.
   - When a repair part (HDD) is transported and there is a large temperature difference between outdoors and indoors, to the indoor, leave it in its package for about a half day to gradually cool or warm the HDD to room temperature before unpacking it.

[Notes on packing for shipment]

- When returning a defective HDD for analysis, handle with care as if it were a good product. Otherwise, the results of analysis may not be correct.
- When packing, use the antistatic bag and packing materials in which the repair part for service was delivered. Attach a copy of the slip for service or a memo stating symptoms in as much detail as possible.

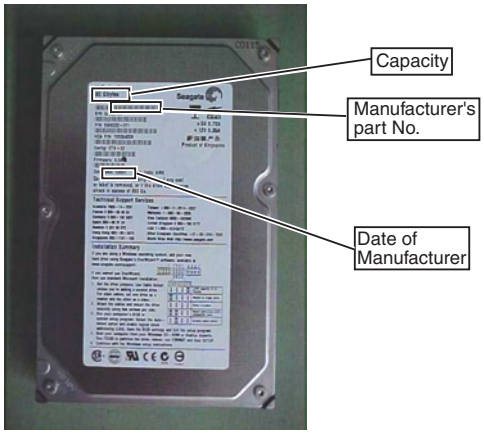
■ Outline and part No. of the HDDs

*Pioneer's part No. is not stamped.

Model Name	Capacity	Western Digital		SEAGATE	
		Pioneer's Part No. (for service)	Manufacture's Part No.	Pioneer's Part No. (for service)	Manufacture's Part No.
DVR-545HX-S	160GB	VXF1066	WD800BB -xxJKCx	VXF1110	ST3160212 S

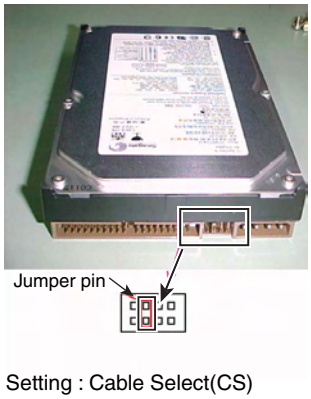
- When replacing the HDD, carefully check the capacity and manufacturer's part No. on the part label to avoid replacing with a similar but inappropriate product. You can also check the model No. of the mounted HDD on the Service mode screen.
- Do NOT use repair parts, such as commercially available HDDs, other than those designated above, as their functions, performance or reliability cannot be guaranteed.

Seagate(160G)



■ Confirmation of the jumper pin location of the HDD

Seagate



Setting : Cable Select(CS)

7.4 DISC/CONTENT FORMAT

	HDD	DVD-R		DVD-RW		DVD+R	DVD +RW	DVD-RAM
Marks used in this manual	HDD	DVD (VR) *1	DVD (Video)	DVD (VR) *1	DVD (Video) *2	DVD+R	DVD+RW	DVD-RAM *13, 16
Logos	HDD HARD DISK DRIVE	DVD R		DVD RW	DVD RW RW 2	RW DVD+R	RW DVD+ReWritable RW DVD+ReWritable	DVD RAM
Re-recordable / Erasable	●	● *3	● *3	●	●	*3	● *14	●
Editing of recorded programs	●	●	● *4	●	● *4	● *4	● *4	●
Recording of Copy-once protected material	●	● *12		● *12				● *12
Playback in other players/recorders	n/a	*5	● *6	● *7	● *6	● *6, 15	● *8	● *9
Chase play	●							
16:9 and 4:3 program recording	●	●		●				●
Bilingual broadcast recording of both audio channels	● *10, 11	● *11		● *11				● *11

Notes to table

**1 Must be initialized for VR mode recording*
**2 Must be initialized for Video mode recording*
**3 Erasable, but free space does not increase*
**4 Cannot erase sections, edit chapters or use playlist editing*
**5 Must be compatible with DVD-R(VR) playback*
**6 Finalize using this recorder (may not playback in some units)*
**7 Must be compatible with DVD-RW(VR) playback*
**8 Must be compatible with DVD+RW playback*
**9 Must be compatible with DVD-RAM playback*
**10 Only when HDD Recording Format is set to Video Mode Off*
**11 Only when the recording mode is not set to LPCM*
**12 CPRM-compatible discs only*
**13 Take the disc out of the cartridge before use. Only Matsushita and Maxell discs have been tested to work reliably with this recorder. Discs from other makers may become unusable when recorded or edited.*
**14 Erasing a title does not increase the available recording time, nor increase the number of recordable titles left.*
**15 Must be compatible with DVD+R playback*
**16 Depending on the disc, it may have to be initialized before it can be recorded. In this case, initialization will take about 1 hour.*

DVD is a trademark of DVD Format/Logo Licensing Corporation.

Using DVD-R DL/DVD+R DL discs

DVD-R DL (dual-layer) and DVD+R DL (double-layer) discs contain two recordable layers on a single side, giving about 1.8 times the recording capacity of a conventional single-layer disc. This unit can record to both DVD-R DL and DVD+R DL discs.

- If you intend to play DVD-R DL (Video mode) or DVD+R DL discs recorded on this unit on other DVD recorders/players, you must finalize them. (Note that some DVD recorders/players may not play even finalized DL discs.)
- Please read the information provided on the disc packaging carefully before purchasing DVD-R DL/DVD+R DL discs:
- *Confirm the disc version:* Use ver. 3.0 / 2 x to 4 x DVD-R discs.
- *Confirm the recording speed :* DVD-R should be compatible with 2 x or 4 x recording; DVD+R with 2.4 x to 8 x recording.
- This logo indicates that the disc is a DVD-R DL or DVD+R DL disc:

DVD R DL 4X/2X RW DVD+R DL

- Correct operation has been confirmed for DVD-R DL discs (Ver. 3.0 / 2 x, 4 x) produced by the following manufacturers: Mitsubishi Kagaku Media, Verbatim (as of March 2005).

About DualDisc playback

A DualDisc is a new two -sided disc, one side of which contains DVD content -video, audio, etc. -while the other side contains non-DVD content such as digital audio material.

The non-DVD, audio side of the disc is not compliant with the CD Audio specification and therefore may not play.

It is possible that when loading or ejecting a DualDisc, the opposite side to that being played will be scratched. Scratched discs may not be playable.

The DVD side of a DualDisc plays in this product. DVD-Audio content will not play.

For more detailed information on the DualDisc specification, please refer to the disc manufacturer or disc retailer.

Other disc compatibility

In addition to DVD, this recorder is compatible with a wide range of disc types (media) and formats. Playable discs will generally feature one of the following logos on the disc and/or disc packaging. Note however that some disc types, such as recordable CD (and DVD), may be in an unplayable format - see below for further compatibility information.

CD-R/RW compatibility

This recorder cannot record CD-R or CD-RW discs.

- Readable formats: CD-Audio, Video CD/ Super VCD, ISO 9660 CD-ROM* containing MP3, WMA, JPEG or DivX files.
  * *ISO 9660 Level 1 or 2 compliant. CD physical format: Mode1, Mode2 XA Form1. Romeo and Joliet file systems are both compatible with this recorder.*
- Multi-session playback: Yes (except CD-Audio and Video CD/Super VCD)
- Unfinalized disc playback: CD-Audio only

Compressed audio compatibility

- Compatible media: CD-ROM, CD-R, CD-RW
- Compatible formats: MPEG-1 Audio Layer 3 (MP3), Windows Media Audio (WMA)
- Sampling rates: 32 kHz, 44.1 kHz or 48 kHz
- Bit-rates: Any (128 Kbps or higher recommended)
- Variable bit-rate (VBR) MP3 playback:Yes
- VBR WMA playback: No
- WMA encoder compatibility: Windows Media Codec 8*(files encoded using Windows Media Codec 9 may be playable but some parts of the specification are not supported; specifically, Pro, Lossless, Voice and VBR)*
- DRM (Digital Rights Management)[1] file playback: No
- File extensions: .mp3, .wma (these must be used for the recorder to recognize MP3 and WMA files - do not use for other file types)
- File structure: Up to 99 folders / 999 files (if these limits are exceeded, only files and folders up to these limits are playable)

WMA (Windows Media Audio) compatibility

The Windows Media® logo printed on the box indicates that this recorder can playback Windows Media Audio content.

WMA is an acronym for Windows Media Audio and refers to an audio compression technology developed by Microsoft Corporation. WMA content can be encoded by using Windows Media® Player for Windows® XP, Windows Media® Player 9 or Windows Media® Player 10 series.

Microsoft, Windows Media, and the Windows logo are trademarks, or registered trademarks of Microsoft Corporation in the United States and/or other countries.

DivX video compatibility

DivX is a compressed digital video format created by the DivX® video codec from DivX, Inc. This recorder can play DivX video files burned on CD-R/RW/ROM discs. Keeping the same terminology as DVD-Video, individual DivX video files are called "Titles." When naming files/titles on a CD-R/RW disc prior to burning, keep in mind that by default they will be played in alphabetical order.

- Official DivX® Certified product.
- Plays all versions of DivX® video (including DivX® 6) with standard playback of DivX® media files.
- File extensions: .avi and .divx (these must be used for the recorder to recognize DivX video files). *Note that all files with the .avi extension are recognized as MPEG4, but not all of these are necessarily DivX video files and therefore may not be playable on this recorder.*
- File structure: Up to 99 folders or 999 files.

DivX, DivX Certified, and associated logos are trademarks of DivX, Inc. and are used under license.

DivX® VOD content

DivX

In order to play DivX VOD (video on demand)

Note

1 DRM (digital rights management) copy protection is a technology designed to prevent unauthorized copying by restricting playback, etc. of compressed audio files on devices other the PC (or other recording equipment) used to record it. For detailed information, please see the instruction manuals or help files that came with your PC (or other WMA recording equipment) and/or software.

content on this recorder, you first need to register the recorder with your DivX VOD content provider. You do this by generating a DivX VOD registration code, which you submit to your provider.

Some DivX VOD content may only be playable a fixed number of times. When you load a disc containing this type of DivX VOD content, the remaining number of plays is shown on-screen and you then have the option of playing the disc (thereby using up one of the remaining plays), or stopping. If you load a disc that contains expired DivX VOD content (for example, content that has zero remaining plays), the message **Rental Expired** is displayed.

If your DivX VOD content allows an unlimited number of plays, then you may load the disc into your recorder and play the content as often as you like, and no message will be displayed.

Important

- DivX VOD content is protected by a DRM (Digital Rights Management) system. This restricts playback of content to specific, registered devices.
- If you load a disc that contains DivX VOD content not authorized for this recorder, the message **Authorization Error** is displayed and the content will not play.
- Resetting the recorder will not cause you to lose your registration code.

JPEG file compatibility

- Compatible formats: Baseline JPEG and EXIF 2.2* still image files
  * *File format used by digital still cameras*
- Sampling ratio: 4:4:4, 4:2:2, 4:2:0
- Horizontal resolution: 160 to 5120 pixels
- Vertical resolution: 120 to 3840 pixels
- Progressive JPEG compatible: No
- File extensions: .jpg, .jpeg, .jpe, .jif, .jfif (must be used for the recorder to recognize JPEG files - do not use for other file types)
- File structure: The recorder can load up to 99 folders / 999 files at one time*(if there are more files/folders that this on the disc then more can be reloaded)*

PC-created disc compatibility

Discs recorded using a personal computer may not be playable in this unit due to the setting of the application software used to create the disc. In these particular instances, check with the software publisher for more detailed information.

Discs recorded in packet write mode (UDF format) are not compatible with this recorder.

Check the DVD-R/RW or CD-R/RW software disc boxes for additional compatibility information.

Dolby Digital

Manufactured under license from Dolby Laboratories. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories.

DTS

"DTS" and "DTS Digital Out" are registered trademarks of Digital Theater Systems, Inc.

DVB

DVB for short, is a set of open standards for digital broadcasting, covering terrestrial, cable and satellite broadcasts.

Based around the MPEG-2 coding system, these open standards ensure that compliant systems are able to work together, independent of manufacturer.

DVB is extremely flexible, being able to deliver virtually any kind of digital content to the home, including High Definition and Standard Definition TV, broadband multimedia content and interactive services.

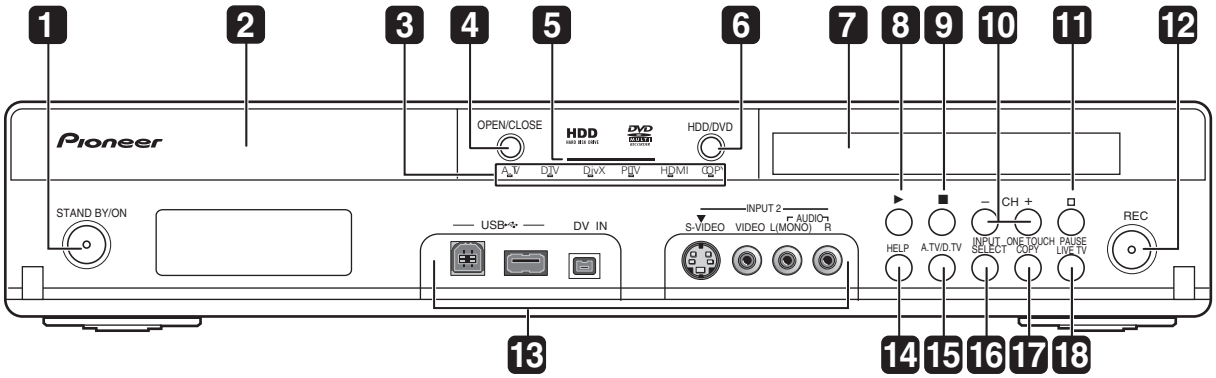
DVB

DVB is a registered trademark of the DVB Project.

8. PANEL FACILITIES

8.1 FRONT PANEL

● Front panel



1 ⏻ STANDBY/ON
Press to switch the recorder on/into standby.

2 Disc tray

3 A.TV indicator
Lights when analog TV is selected.

D.TV indicator
Lights when digital TV is selected.

DivX indicator
Lights during DivX playback.

PLTV indicator
Lights during recording started using the Pause Live TV feature.

HDMI indicator
Lights when this recorder is connected to HDMI (HDCP) component.

COPY
Light during copying.

4 ⏏ OPEN/CLOSE
Press to open/close the disc tray.

5 HDD / DVD indicators
Indicator lights blue when the hard disk (HDD) is selected; orange when the DVD drive is selected.

6 HDD/DVD
Press to switch between HDD and DVD for recording and playback.

7 Front panel display and IR remote sensor

8 ►
Press to start or restart playback.

9 ■
Press to stop playback.

10 CH +/–
Use to change channels, skip chapters/tracks, etc.

11 □ (STOP REC)
Press to stop recording.

12 ● REC
Press to start recording. Press repeatedly to set the recording time in 30 minute blocks.

13 Front panel inputs (INPUT2/USB port/DV IN)
Audio/video input (stereo analog audio; composite and S-Video video), especially suitable for camcorders, game consoles, portable audio, etc.
USB port Type B for connecting a PictBridge compatible printer. USB port Type A for connecting a digital camera, USB memory or other USB device.
DV IN for i.Link connector, suitable for connecting a DV camcorder.

14 HELP
Press for help on how to use the current GUI screen.

15 A.TV / D.TV
Switches between analog TV antenna input and digital TV antenna input. The **A.TV** and **D.TV** indicators show which is selected.

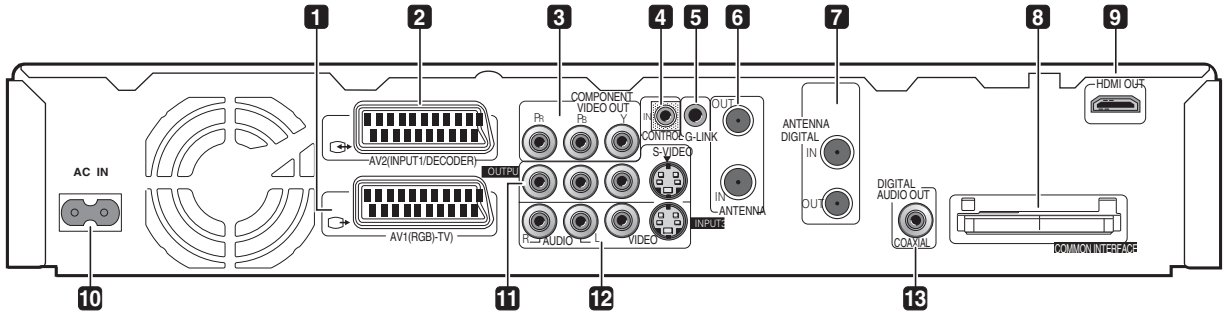
16 INPUT SELECT
Press to change the input to use for recording.

17 ONE TOUCH COPY
Press to start One Touch Copy of the currently playing title to DVD or the HDD.

18 PAUSE LIVE TV
Press to start recording the current TV channel, but with playback paused, effectively pausing the broadcast.

8.2 REAR PANEL

● Rear panel



1 AV1(RGB)-TV AV connector
Audio/video output SCART-type AV connector for connecting to a TV or other equipment with a SCART connector. The video output is switchable between video, S-Video and RGB.

2 AV2(INPUT 1/DECODER) AV connector
Audio/video input/output SCART-type AV connector for connecting to a VCR, or other equipment with a SCART connector. The input accepts video, S-Video and RGB.

3 COMPONENT VIDEO OUT
A high-quality video output for connecting to a TV or monitor with a component video input.

4 CONTROL IN
Use to control this recorder from the remote sensor of another Pioneer component with a **CONTROL OUT** terminal and bearing the Pioneer mark.
Connect the **CONTROL OUT** of the other component to the **CONTROL IN** of this recorder using a mini-plug cord.

5 G-LINK™
Use to connect the supplied G-LINK™ cable to enable GUIDE Plus+™ to control an external satellite receiver, etc.

6 ANTENNA IN (RF IN)/OUT
Connect your TV antenna to the **ANTENNA (RF IN)** jack. The signal is passed through to the **ANTENNA OUT** jack for connection to your TV.

7 ANTENNA (DIGITAL) IN/OUT
Connect your DTV antenna to the **ANTENNA (DIGITAL) IN** jack. The signal is passed through to the **ANTENNA (DIGITAL) OUT** jack for connection to your TV.

8 COMMON INTERFACE slot
Slot for CA module and smart card used to decode scrambled D.TV channels.

9 HDMI OUT
HDMI output for high quality digital audio and video.

10 AC IN – Power inlet

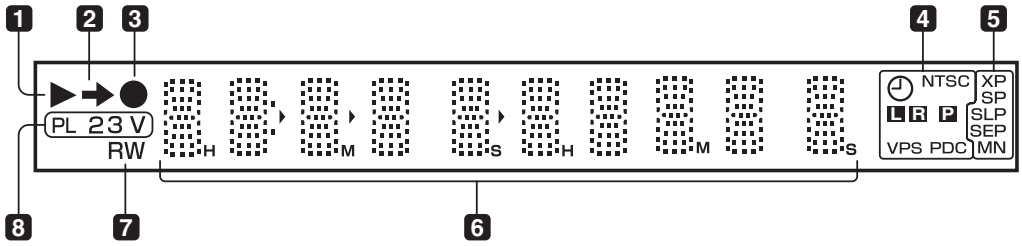
11 OUTPUT
Stereo analog audio, video and S-Video outputs for connection to a TV or AV amplifier/receiver.

12 INPUT3
Stereo analog audio, video and S-video inputs for connection to a VCR or other source component.

13 DIGITAL AUDIO OUT COAXIAL
Coaxial digital audio jack for connecting to an AV amplifier /receiver, Dolby Digital/DTS/MPEG decoder or other equipment with a digital input.

8.3 DISPLAY

● Display



1 ►
Lights during playback; blinks when playback is paused.

2 →
Lights when copying.

3 ●
Lights during recording; blinks when recording is paused.

4 ◴
Lights when a timer recording has been set. (Indicator blinks if the timer has been set to DVD but there isn't a recordable disc loaded, or the timer has been set to HDD but the HDD is not recordable.)

NTSC
Lights when the video output signal format is NTSC.

L R
Indicates which channels of a bilingual broadcast are recorded.

P
Lights when the component video output is set to progressive scan.

VPS / PDC
Lights when receiving a VPS/PDC broadcast during a VPS/PDC-enabled timer recording.

5 Recording quality indicators

XP
Lights when the recording mode is set to **XP** (best quality).

SP
Lights when the recording mode is set to **SP** (standard play).

LP / SLP
Lights when the recording mode is set to **LP** (long play) or **SLP** (super-long play).

EP / SEP
Lights when the recording mode is set to **EP** (extended play) or **SEP** (super-extended play).

MN
Lights when the recording mode is set to **MN** (manual recording level) mode.

6 Character display

7 R / RW
Lights when a recordable DVD-R or DVD-RW disc is loaded.

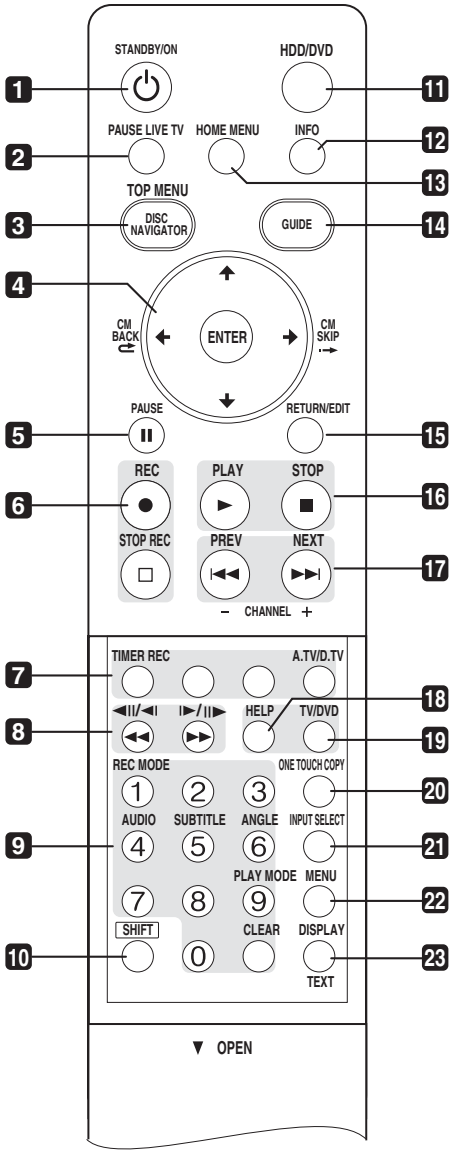
8 PL
Lights when a VR mode disc is loaded and the recorder is in Play List mode.

23
Shows the remote control mode (if nothing is displayed, the remote control mode is 1).

V
Lights when an unfinalized Video mode disc is loaded.

8.4 REMOTE CONTROL

● Remote control



1 ⏻ STANDBY/ON
Press to switch the recorder on/into standby.

2 PAUSE LIVE TV
Press to start recording the current TV channel, but with playback paused, effectively pausing the broadcast.

3 DISC NAVIGATOR / TOP MENU
Press to display the Disc Navigator screen, or the top menu if a DVD-Video or finalized DVD-R/-RW (Video) disc is loaded.

4 ↑/↓/←/→ and ENTER
Used to navigate all on-screen displays. Press **ENTER** to select the currently highlighted option. While watching D.TV press **ENTER** to display the Channel List screen.

CM BACK (commercial back)
Press repeatedly to skip progressively backward through the audio or video playing.

CM SKIP (commercial skip)
Press repeatedly to skip progressively forward through the audio or video playing.

5 ⏸PAUSE
Press to pause playback or recording.

6 Recording controls
● REC
Press to start recording. Press repeatedly to set the recording time in blocks of 30 mins. When the red action button is visible in a GUIDE Plus+™ screen, use for One-Button-Record.

□ STOP REC
Press to stop recording.

7 Colour buttons
(RED, GREEN, YELLOW, BLUE)
Use when an EPG screen is displayed or when tuned to a data channel of a digital broadcast. The function of each button will be described on-screen, and changes depending on the screen being displayed.

TIMER REC
Hold **SHIFT** and press to set a timer recording from the GUIDE Plus+™ system.

A.TV / D.TV
Hold **SHIFT** and press to switch between analog TV antenna input and digital TV antenna input. The **A.TV** and **D.TV** indicators on the front panel show which is selected.

8 ◄◄ ►►
Press to start reverse or forward scanning. Press again to change the speed.

◄⏸/◄I I►/⏸►
While paused, press and hold to start slow-motion playback. Press repeatedly to change the playback speed.
While paused, press to advance a single frame in either direction.
When GUIDE Plus+™ is displayed, use to display the previous/next day.

9 Number buttons, CLEAR
Use the number buttons for track/chapter/title selection; channel selection, and so on. The same buttons can also be used to enter names for titles, discs and so on. Use **CLEAR** to clear an entry and start again.

REC MODE
Hold **SHIFT** and press repeatedly to change the recording mode (picture quality).

AUDIO
Hold **SHIFT** and press to change the audio language or channel. (When the recorder is stopped, press to change the tuner audio.)

SUBTITLE
Hold **SHIFT** and press to display/change the subtitles included in multilingual DVD-Video discs.
While watching D.TV, press to change the D.TV subtitles.

ANGLE
Hold **SHIFT** and press to switch camera angles on discs with multi-angle scenes.

PLAY MODE
Hold **SHIFT** and press to change the play mode (search, repeat, program play, etc.).

10 SHIFT
Use to access functions on the remote printed in green.

11 HDD/DVD
Press to select the hard disk (HDD) or DVD for recording and playback.

12 INFO
While watching D.TV, press to display the information banner.
Press to see additional information for the highlighted item in the EPG.

13 HOME MENU
Press to display the Home Menu, from which you can navigate all the functions of the recorder.

14 GUIDE
Press to display the EPG screen; press again to exit.

15 RETURN/EXIT
Press to go back one level in the on-screen menu or display.
Also press to exit the MHEG application.

16 ►PLAY
Press to start playback.

■STOP
Press to stop playback.

17 CHANNEL +/–
Press to change the channel of the built-in TV tuner.

I◄◄ PREV ►►I NEXT
Press to skip to the previous or next title/chapter/track/folder; or to display the previous or next menu page.
When GUIDE Plus™ is displayed, use to display the previous/next page.

18 HELP
Press for help on how to use the current GUI screen.

19 TV/DVD
Press to switch between "TV mode", in which you get the picture and sound from the TV's tuner, and "DVD mode", in which you get picture and sound from the recorder's tuner (or an external input).

20 ONE TOUCH COPY
Press to start One Touch Copy of the currently playing title to DVD or the HDD.

21 INPUT SELECT
Press to change the input to use for recording.

22 MENU
Press to display the disc menu if a DVD-Video, finalized DVD-R/-RW or finalized DVD+R/+RW disc is loaded.
When in the GUIDE Plus+™ system, use to jump directly to the Menu bar.

23 DISPLAY
Displays/changes the on-screen information displays.

TEXT
Hold **SHIFT** and press to start the MHEG application display, if available, while watching a digital channel (UK only).

■ Jigs list

Name	Jig No.	Remarks
Service Remote Control Unit	GGF1381	Adjustment, diagnosis
DVD Test Disc (DVD-Video)	GGV1025	Check of DVD-Video
DVD Recorder Data Disc Type2	———— (*)	Diagnosis (ID data setting)
Extension Board	GGF1533(A)/GGF1533(B)	Diagnosis of DTBR Assy
Extension Cable (28P)	GGD1437	Diagnosis of DTBR Assy
4P Power Cable	VKP2291	Extension of HDD
Jig for LD Power Adjustment	GGF1559	LD Power Adjustment
FFC Cable (10P)	GGD1477	LD Power Adjustment
CD-ROM Test Disc	GGV1054	LD Power Adjustment
DVD Dual Layer Test Disc	GGV1036	LD Power Adjustment

(*) Be sure to use the latest disc (Type 2).
In May, 2006, the latest disc is GGV1273.

■ Lubricants and Glues list

Name	Lubricants and Glues No.	Remarks
Hanarl	GEM1041	refer to "2.4 FRONT PANEL SECTION"

Before shipping out the product, be sure to clean the following positions by using the prescribed cleaning tools:

Position to be cleaned	Cleaning tools
Pickup lenses	Cleaning liquid : GEM1004 Cleaning paper : GED-008

Position to be cleaned	Cleaning tools
Fans	Cleaning paper : GED-008